

# THE FISCAL YEAR 2017 DEPARTMENT OF ENERGY BUDGET

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## HEARING BEFORE THE SUBCOMMITTEE ON ENERGY AND POWER OF THE COMMITTEE ON ENERGY AND COMMERCE HOUSE OF REPRESENTATIVES ONE HUNDRED FOURTEENTH CONGRESS SECOND SESSION

MARCH 2, 2016

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<sup>1</sup>The information has been retained in committee files and also is available at <http://docs.house.gov/meetings/IF/IF03/20160302/104593/HHRG-114-IF03-Wstate-MonizE-20160302-SD086.pdf>.

<sup>2</sup>The information has been retained in committee files and also is available at <http://docs.house.gov/meetings/IF/IF03/20160302/104593/HHRG-114-IF03-20160302-SD033.pdf>.



## THE FISCAL YEAR 2017 DEPARTMENT OF ENERGY BUDGET

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WEDNESDAY, MARCH 2, 2016

HOUSE OF REPRESENTATIVES,  
SUBCOMMITTEE ON ENERGY AND POWER,  
COMMITTEE ON ENERGY AND COMMERCE,  
*Washington, DC.*

The subcommittee met, pursuant to call, at 10:07 a.m., in room 2123, Rayburn House Office Building, Hon. Ed Whitfield (chairman of the subcommittee) presiding.

Members present: Representatives Whitfield, Olson, Shimkus, Latta, McKinley, Kinzinger, Griffith, Johnson, Long, Ellmers, Mullin, Hudson, Upton (ex officio), Rush, McNerney, Tonko, Capps, Doyle, Castor, Sarbanes, Welch, Yarmuth, Loeb sack, and Pallone (ex officio).

Staff present: Gary Andres, Staff Director; Will Batson, Legislative Clerk; Sean Bonyun, Communications Director; Leighton Brown, Deputy Press Secretary; Patrick Currier, Senior Counsel, Energy and Power; Tom Hassenboehler, Chief Counsel, Energy and Power; A.T. Johnson, Senior Policy Advisor; Ben Lieberman, Counsel, Energy and Power; Brandon Mooney, Professional Staff Member, Energy and Power; Mary Neumayr, Senior Energy Counsel; Annelise Rickert, Legislative Associate; Chris Sarley, Policy Coordinator, Environment and the Economy; Dan Schneider, Press Secretary; Peter Spencer, Professional Staff Member; Andy Zach, Counsel, Energy and the Environment; Christine Brennan, Democratic Press Secretary; Jeff Carroll, Democratic Staff Director; Rick Kessler, Democratic Senior Advisor and Staff Director, Energy and the Environment; Josh Lewis, Democratic EPA Detailee; John Marshall, Democratic Policy Coordinator; Matt Schumacher, Democratic Press Assistant; Andrew Souvall, Democratic Director of Communications, Outreach, and Member Services; and Tuley Wright, Democratic Energy and Environment Policy Advisor.

Mr. WHITFIELD. I would like to call this hearing to order.

Of course, today we are having a hearing on the Department of Energy's fiscal year 2017 budget. We are delighted that Secretary Moniz is here with us today to, I guess I will say, defend the budget because we do have some differences of opinion.

But, at this time, I would like to recognize myself 5 minutes for an opening statement. And, Mr. Secretary, we are delighted you are here. And we enjoy working with you even though, as I said, we do have some significant differences on some of the policies.

**OPENING STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF KENTUCKY**

My concerns about prior years' budgets are repeated in this year's budget. I take serious issue with the nearly 10 percent increase in overall funding level requests. And I personally still question the direction DOE is taking on energy policy. I should note that there are issues that we certainly agree with DOE, at least in principle, and there is much in the agency's Quadrennial Energy Review that I think we all support. We all agree on the need to modernize, and protect the Nation's energy infrastructure and the need to have a well-trained and diversified energy workforce with the skills that energy markets will demand in years to come.

We all recognize the importance of a more integrated North American energy system, and the benefits of engaging in energy diplomacy, and conducting ourselves like the energy superpower really that we have become. We agree on taking steps to improve energy efficiency and accountability, especially in regard to the Federal Government's own use of energy, as well as the functioning of DOE itself. And most of us agree on the agency's commitment to research and development.

But on many areas, and the direction, in which this agency is taking with its energy policy, I personally, respectfully, disagree. Most significantly, this budget continues to reflect the President's priority to treat climate change as the number one issue facing America and is DOE's overriding concern.

One of DOE's stated priorities, in the fiscal year 2017 budget request, is to support ongoing implementation of the President's climate action plan. We see this in the programs that have received proposed budget increases, like the \$2.9 billion, for the Office of Energy Efficiency and Renewable Energy, a 40 percent increase. A 63 percent increase for wind energy, a 22 percent increase for corporate support, at the same time, a reduction of nuclear R&D by 23 percent, a reduction in nuclear technology by 20 percent.

And I might add that the administration has chosen to make climate an agency priority without any statutory authority from Congress directing DOE to focus on global warming. As part of the Paris Agreement, a nonbinding agreement, Obama and 19 other countries launched a program known as Mission Innovation in order to accelerate global energy innovation by doubling the amount of our taxpayer dollars in clean energy R&D over the next 5 years. And so the things included in Mission Innovation we have used before, but there is a 21 percent increase in the budget request.

The budget also evidences a misguided perspective on the proper role of Government in energy policy. A cleaner, more advanced and efficient energy system can be achieved through primarily private sector innovation and markets, supported by Government-backed research and development, not a top-down, Government-mandated approach. Yet, almost everywhere in this budget, we see DOE trying to expand its role and impose its own preferences on the private sector. And I might say that I personally take responsibility, I went back and looked at, certainly it is not all up to me, but since

2009, there has been a 35 percent increase in budget requests from DOE.

During that same time, household median income has gone down by 2 percent since the President has been in office. So that reflects really what is happening in Government. We keep getting all these requests for increases. And, yet, the American people, they, their household income actually is decreasing. And I take responsibility for it because here I am, chairman of the Energy and Power Subcommittee, we should be working closer with the appropriators. Because the appropriators seem to just keep following down, giving more money. And, yet, we should be, as a committee, pressing them on what we think. We have as much jurisdiction over energy as certainly the appropriators do. They appropriate the money.

But I personally, this year, am going to try to have more interchange with them, exchange of ideas, dialogue with them to give them our very strong views on where we think the President is wrong on his priorities for DOE. With that, at this time, I would like to recognize the distinguished gentleman from Illinois, Mr. Rush, for a 5-minute opening statement.

[The prepared statement of Mr. Whitfield follows:]

#### PREPARED STATEMENT OF HON. ED WHITFIELD

Today is our final Department of Energy budget hearing for the Obama administration. We are always delighted to have Secretary Moniz here and look forward to his remarks.

My concerns about prior years' budgets are repeated in this year's budget. I take serious issue with the nearly 10 percent boost in overall funding levels and I still question the direction DOE is taking on energy policy.

I should note that there are issues that we can agree with DOE, at least in principle, and there is much in the agency's Quadrennial Energy Review that I think we all can support. We all agree on the need to modernize and protect the Nation's energy infrastructure and the need to have a well-trained and diversified energy workforce with the skills that energy markets will demand in the years ahead. We all recognize the importance of a more integrated North American energy system and the benefits of engaging in energy diplomacy and conducting ourselves like the energy superpower we have become. We agree on taking steps to improve energy efficiency and accountability, especially as regards the Federal Government's own use of energy as well as the functioning of DOE itself. And most of us agree on the agency's commitment to research and development.

But on many areas and the direction in which this agency is taking with its energy policy, I respectfully disagree. Most significantly, this budget continues to reflect the President's priority and treat climate change as DOE's overriding concern. One of DOE's stated priorities in the FY 2017 budget request is to "support ongoing implementation of the President's Climate Action Plan." We see this in the programs that have received proposed budget increases, like the \$2.1 billion for the Office of Energy Efficiency and Renewable Energy, as well as those facing cuts, such as the 43 percent cut in the Office of Fossil Energy.

In fact, the Office of Energy Efficiency and Renewable Energy is slated to get more funds than the Offices of Nuclear, Fossil, Electricity, and ARPA—E combined. Within the budget's largest new program, the 21st Century Clean Transportation plan makes climate concerns the primary factor in transportation policy by inserting a new tax on oil that will raise gas prices by about 25 cents per gallon. This action alone speaks volumes about how badly off track this administration has gotten on energy policy. And I might add that the administration has chosen to make climate an agency priority without any statutory authority actually directing DOE to focus on global warming. As part of the Paris agreement, Obama and 19 other countries launched a program known as "Mission Innovation" in order to accelerate global green energy innovation by doubling the amount of our taxpayer dollars in clean energy R&D over the next 5 years.

The problem with this climate myopia is that it comes at the expense of other priorities that DOE should be more focused upon, like ensuring plentiful and affordable supplies of domestic energy, including fossil fuels. To me this runs counter to

the very purpose for which the agency was created. Indeed, the Obama DOE's antipathy towards fossil fuels represents the first time the agency has so actively opposed an affordable domestic energy source.

Access to affordable and reliable energy is key to stimulating economic growth and strengthening our global competitiveness and it should be a priority for this agency. In contrast, putting climate first increases energy costs, restrains growth, destroys jobs, and reduces household spending power, especially low-income households.

The budget also evidences a misguided perspective on the proper role of Government in energy policy. A cleaner, more advanced and efficient energy system can be achieved through private sector innovation and markets, supported by Government-backed research and development—not a top-down, Government-mandated approach. Yet almost everywhere in this budget we see DOE trying to expand its role and impose its own preferences on the private sector.

DOE's high budget request is bad enough, but the energy policy it would pay for is even worse. We can do much better in this budget, but we must prioritize affordable energy, economic growth, and jobs.

#### **OPENING STATEMENT OF HON. BOBBY L. RUSH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS**

Mr. RUSH. Thank you, Mr. Chairman. I want to thank you for holding today's hearing on DOE's fiscal year 2017 budget request. And, as always, Mr. Chairman, it is my pleasure to welcome to this subcommittee Secretary Moniz, who I like to refer to as our superstar Secretary. Mr. Secretary, your legacy at the Department of Energy is unsurpassed, in my opinion, as you have left your mark on a wide range of critically important issues, from your outstanding contribution in negotiating the Iran Nuclear Deal, to re-opening the agency so that it can more effectively address the challenges of the present and the future.

There is no doubt in my mind, Mr. Secretary, that you have set the gold standard as Energy Secretary in terms of your effectiveness and forward-looking policies. And I, for one, will evaluate future heads of the agency by the great legacy that you have established. Mr. Chairman, before Secretary Moniz took over the reins of the Department, there were millions of Americans who had no idea of what the Department of Energy even did, and many more who mistakenly believed the agency's policies had little to no impact on their lives. And I am proud to have been able to partner with the Secretary and his agency on a number of important initiatives that will affect the lives of many American families for years, if not decades, to come.

Mr. Chairman, following a private meeting in my office some years ago, rather than giving the customary lip service, and go on conducting his business as usual, Secretary Moniz went back to the agency and created the Minorities in Energy Initiative. Mr. Chairman, this single most important initiative, which was designed to increase DOE's outreach, engagement, and access for minority communities, recently celebrated its second-year anniversary, with Minorities in Energy ambassadors from all across the country, representing all sectors of the energy industry and beyond.

I am proud to inform the Secretary that on this past Monday, with the help and support of Chairman Whitfield, Chairman Upton, Ranking Member Pallone, and many others of my colleagues on this subcommittee, the House just passed the 21st Century Workforce legislation which, among other important priorities,



Mr. Secretary, would also codify the Minorities in Energy Initiative.

Mr. Chairman, I must also commend Secretary Moniz for significantly expanding the Minority Internship Program at the Department, from only 50 candidates a few years ago, to over 100 interns who participated this past summer. This important program provides young men and young women with invaluable exposure, networking opportunities, and critical work experience that can be parlayed into important career opportunities down the line.

Mr. Chairman, I also look forward to engaging the Secretary on the important work that we both have been intimately involved in regarding opening up the National Research Laboratories and all of their resources to all segments of the American population. Secretary Moniz and I have both expressed our desire to see these labs become more diverse in terms of their leadership, their hiring practices, their contracting, and vending opportunities, as well as, providing internships and outreach programs to 10 to 12 schools and minority-serving higher education institutions.

So, Mr. Chairman, I look forward to hearing about the progress that has been made in these areas. And with that, I yield back the balance of my time. And thank you, Mr. Chairman.

Mr. WHITFIELD. The gentleman yields back. At this time, the Chair recognizes the chairman of the full committee, Mr. Upton, for 5 minutes.

**OPENING STATEMENT OF HON. FRED UPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN**

Mr. UPTON. Thank you, Mr. Chairman. Secretary Moniz, welcome back. Let me first say how much I truly have appreciated your efforts as Secretary to come before this committee and work with us on both sides of the aisle. Never been one to shy away from coming up to the Hill, engaging us, even when we might disagree. I credit you and your staff with the great work that you have done, particularly with the Quadrennial Energy Review, which helped shape our bipartisan approach to energy legislation in this Congress.

While some of the provisions we worked on together were enacted as part of an energy security title in the highway bill, I still am hopeful that similar legislation can and will get through the Senate, perhaps as early as tomorrow, so that we can get a conference negotiation underway.

We look forward, Chairman Murkowski and myself, to working with you on an incredible new era of abundance, as it is important that our policies reflect these 21st century realities. We should be promoting and embracing our resources to keep energy affordable for folks in Michigan and across the country. I will take note that the President's budget takes a slightly different approach, particularly as it relates to the gas tax as it impacts the most vulnerable. However, our abundance on coal, oil, and natural gas, along with nuclear, hydro, and renewables does put us in charge of our energy destiny and makes the future of affordable and reliable energy an achievable one for the country.

The biggest threat to this bright future is no longer OPEC or any other outside menace. It is, instead, the misguided policies that

sometimes pick winners and losers. And, unfortunately, we see much of that in this budget. One area in which I am interested in learning more about is the administration's recent commitments to double Government-wide research and development over the next 5 years as part of the Mission Innovation.

Continued breakthroughs in the way that we produce, transmit, and consume energy are needed in order to meet 21st century threats, be it from cyber, severe weather, physical attacks on our infrastructure. Many in the private sector are leaping at the challenge, including Bill Gates, and some of our leading innovators and entrepreneurs as part of the breakthrough coalition. And the recent announcements and financial commitments appear to be very promising. And I look forward to hearing from you on that.

Congress, however, will need more information before responding to the budget requests as to how limited DOE research dollars will work to augment the commitments made by the private sector. In a challenging budget environment, we will need to ensure there is no duplication. And the transparency, competitiveness, and impacts of consumer costs and reliability are front and center and that the technologies and pathways considered are truly resource neutral.

As always, I know you and your staff will continue to be ready to assist us, to work with us. And I look forward to your testimony. And I yield back.

[The prepared statement of Mr. Upton follows:]

#### PREPARED STATEMENT OF HON. FRED UPTON

Secretary Moniz, welcome back. Let me first say how much I have appreciated your efforts as Secretary to come before this committee and work with us on both sides of the aisle. You have never been one to shy away from coming up to the Hill and engaging us, even when we may disagree. I credit you and your staff and the work you have done, in particular with the Quadrennial Energy Review, which helped shape our bipartisan approach to energy legislation this Congress.

While some of the provisions we worked on together were enacted as part of an energy security title in the highway bill, I am still hopeful that similar legislation can, and will, get through the Senate so we can get conference negotiations underway. We are in the midst of an incredible new era of abundance, and it is important our policies reflect these 21st century realities.

As I mentioned, there are inevitably areas where we won't quite see eye to eye, and the president's budget is one of them. We should be promoting and embracing our resources to keep energy affordable for folks in Michigan and across the country. But the president's budget takes a different approach, working to sideline and assail various sources of energy no matter their abundance or importance on family budgets.

In particular, the proposed new 21st Century Clean Transportation System is a prime example. This program, to be funded by a new tax that would raise gasoline prices, would subject our transportation system to a host of costly new climate hoops that put climate concerns first and affordability last.

This and other Washington-based programs in the budget miss a critical point—America's energy success is not due to the decisions of bureaucrats in Washington but to energy entrepreneurs across the country. DOE is at its best when it facilitates free markets, opens up competition, and allows innovators to innovate, not when it tries to micromanage them. Yet the budget has the potential to ratchet up the level of centralized control.

Our domestic abundance of coal, oil, and natural gas, along with nuclear, hydro, and renewables, puts us in charge of our energy destiny and makes a future of affordable and reliable energy an achievable one for this Nation. The biggest threat to this bright future is no longer OPEC or any other outside menace. It is misguided policies that seek to pick winners and losers, and unfortunately we see much of that continue in this proposed budget.

One area in which I am interested in learning more about is the administration's recent commitments to double Government-wide research and development over the next 5 years, as part of Mission Innovation. Continued breakthroughs in the way we produce, transmit, and consume energy are needed in order to meet 21st century threats, be it from cyber, severe weather, or physical attacks on infrastructure. Many in the private sector are leaping at the challenge, including Bill Gates and some of our leading innovators and entrepreneurs as part of the Breakthrough Coalition, and the recent announcements and financial commitments appear to be very promising.

Congress, however, will need more information before responding to the budget requests on how limited DOE research dollars will work to augment the commitments made by the private sector. In this challenging budget environment, we will need to ensure there is no duplication, and that transparency, competitiveness, and impacts on consumer cost and reliability are front and center, and that the technologies and pathways considered are truly resource neutral.

As always, I know you and your staff will be ready to assist and work with us, and I look forward to your testimony.

Mr. WHITFIELD. The gentleman yields back. At this time, the chairman recognizes the gentleman from New Jersey, Mr. Pallone, for 5 minutes.

**OPENING STATEMENT OF HON. FRANK PALLONE, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY**

Mr. PALLONE. Thank you, Mr. Chairman. I would like to also welcome Secretary Moniz back to the committee this morning. Our Nation faces many challenges as we work to lead the global coalition of countries committed to addressing the threat of climate change. The Department of Energy is at the forefront of these efforts here in the United States. And I commend your achievements as Secretary that are helping to make our country a global leader in combatting climate change.

In December, over 190 countries came together to address the common goal of limiting carbon emissions, a threat to all nations. Accelerating clean energy innovation is essential to achieving the goal of limiting the rise in global temperatures to below 2 degrees Celsius. Thanks in part to your continued leadership, we are now on a pathway to a safer, healthier planet for future generations, while creating an enormous opportunity for economic growth.

The fiscal year 2017 Department of Energy budget proposal requests \$32.5 billion for the agency, which represents a \$2.9 billion increase from the 2016 enacted level. And this is a 10 percent increase over 2016 levels and represents a significant investment in your agency.

The bulk of this increase will support Mission Innovation, an initiative launched by the administration in conjunction with the Paris Climate Agreement. Mission Innovation would double research and development in clean energy technology for 5 years. And the bulk of this significant initiative will be led by the Department of Energy. In order to meet the aggressive goals outlined in the Paris Climate Agreement, our country must be seriously dedicated to investment in clean energy technologies. And to that end, Mission Innovation will mark a significant investment in our economy, our environment, and public health.

I support this budget request because it provides the Department of Energy with the tools necessary to catapult our country to the

forefront of 20th century clean energy innovation. These robust increases in funding for the agency are critical to achieving our long-term climate objectives. Mission Innovation also holds the promise of creating an economic opportunity for our country on the scale of the Apollo Program.

There are some requests in this budget that are of specific interest to my State and district. In particular, I strongly support the \$110 billion in the request to support a new competition to establish 10 regional clean energy innovation partnerships around the country. Our country has many hubs of energy research and industry knowledge that can greatly contribute to furthering our clean energy future.

In New Jersey, we have leading academic research institutions, like the Rutgers Energy Institute and Princeton University. A number of renewable, or major renewable energy companies, are headquartered in our State. And we are home to the Princeton Plasma Physics Laboratory, a DOE facility, doing cutting-edge research on fusion energy. I know that New Jersey would be uniquely qualified to host one of these 10 regional partnerships.

I continue to support funding for the Northeast Gasoline Supply Reserve and, again, commend the Secretary for taking action to create this important stockpile of gasoline in the Northeast. As many know, when Hurricane Sandy struck in 2012, access to gasoline was severely limited in the aftermath of the storm, causing major problems in the region, impacting homeowners, businesses, and emergency personnel. And I am pleased that we learned this hard lesson and put in place a plan to make the region more resilient when another storm strikes.

All in all, the critical investments in clean energy included in the budget proposal will put our country on the right track to meet our carbon reduction goals and protect our environment and public health. It sets the stage for renewable energy innovations that will bolster America's clean energy economy. Mr. Secretary, I commend you for your leadership in this area, particularly during the negotiations that led to the landmark climate accord in December.

And I look forward to working with you on these exciting new initiatives, to take action on climate change, and expand our clean energy economy. Thank you again. I yield back.

[The prepared statement of Mr. Pallone follows:]

#### PREPARED STATEMENT OF HON. FRANK PALLONE, JR.

Thank you, Mr. Chairman.

I'd like to welcome Secretary Moniz back to the committee this morning. Our Nation faces many challenges as we work to lead the global coalition of countries committed to addressing the threat of climate change. The Department of Energy is at the forefront of these efforts here in the United States, and I commend your achievements as Secretary that are helping to make our country a global leader in combating climate change.

In December, over 190 countries came together to address the common goal of limiting carbon emissions—a threat to all nations. Accelerating clean energy innovation is essential to achieving the goal of limiting the rise in global temperatures to below 2 degrees Celsius. Thanks, in part, to your continued leadership, we are now on a pathway to a safer, healthier planet for future generations while creating an enormous opportunity for economic growth.

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This is a 10 percent increase over 2016 levels and represents a significant investment in your agency.

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I support this budget request because it provides the Department of Energy with the tools necessary to catapult our country to the forefront of 21st century clean energy innovation. These robust increases in funding for the agency are critical to achieving our long-term climate objectives. Mission Innovation also holds the promise of creating an economic opportunity for our country on the scale of the Apollo program.

There are some requests in this budget that are of specific interest to my State and district. In particular, I strongly support the \$110 million in the request to support a new competition to establish ten Regional Clean Energy Innovation Partnerships around the country. Our country has many hubs of energy research and industry knowledge that can greatly contribute to furthering our clean energy future. In New Jersey, we have leading academic research institutions like the Rutgers Energy Institute and Princeton University. A number of major renewable energy companies are headquartered in our State, and we are home to the Princeton Plasma Physics Laboratory, a DOE facility doing cutting edge research on fusion energy. I know that New Jersey would be uniquely qualified to host one of these ten regional partnerships.

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All in all, the critical investments in clean energy included in this budget proposal will put our country on the right track to meet our carbon reduction goals and protect our environment and public health. It sets the stage for renewable energy innovations that will bolster America's clean energy economy. Mr. Secretary, I commend you for your leadership in this area, particularly during the negotiations that led to the landmark climate accord in December. I look forward to working with you on these exciting new initiatives to take action on climate change and expand our clean energy economy.

Thank you. I yield back my time.

Mr. WHITFIELD. The gentleman yields back. And that concludes the opening statements.

And so, Mr. Secretary, once again, we are delighted you are here. We look forward to your testimony and appreciate your providing answers to questions that we will be asking.

Sir, you are recognized for an opening statement.

#### **STATEMENT OF ERNEST J. MONIZ, SECRETARY, DEPARTMENT OF ENERGY**

Mr. MONIZ. Thank you, Chairmen Upton and Whitfield, Ranking Members Pallone and Rush, and members of the subcommittee. I really appreciate the opportunity to be back with you again to discuss the budget.

Mr. WHITFIELD. Is your microphone on?

Mr. MONIZ. It says it is on. Closer? Then I can't read. OK. The fiscal year 2017 budget request, as you said, totals \$32.5 billion, up from the \$29.6 billion in the fiscal year 2016 appropriation. However, I want to break it up into 2 pieces.

The request for annual appropriations is \$30.2 billion, an increase of \$.6 billion or 2 percent above the fiscal year 2016 enacted appropriation. In fact, both the National Security and the domestic appropriations requests are for 2 percent increases. And certainly this is part of the President's budget that satisfies the budget caps. Now, this is supplemented by a request totaling \$2.3 billion in new mandatory spending authority. It includes \$750 million for R&D within that, and \$674 million for uranium enrichment D&D to which I will return.

Just briefly turning to the major mission areas, the first, Building the Future Through Science and Energy, this total is \$11.3 billion in discretionary funding and \$1.6 in new mandatory. The principal driver for our science and energy budget increase is Mission Innovation. And I will return to this in more detail.

The second general mission area, ensuring nuclear security, the fiscal year 2017 budget request for the National Nuclear Security Administration is for a 3 percent increase, supporting our broad programmatic objectives of maintaining the stockpile without testing now and well into the future, reducing the threat of nuclear proliferation, including support for implementation of the Joint Comprehensive Plan of Action, and proposing a major shift in our plutonium disposition strategy. And, finally, supporting the safe and reliable operation of our nuclear Navy.

Our third major mission area is organizing, managing, and modernizing the Department to better achieve its enduring missions. The fiscal year 2017 budget request provides \$6.8 billion for these activities, including \$6.1 for the Office of Environmental Management. That includes \$5.45 in appropriations and \$674 million in mandatory spending from the USEC Fund.

The \$1.6 billion USEC Fund is an existing, not new, mandatory spending account. And our proposal is in keeping with the spirit of the current authorization that revenues from the beneficiaries of past uranium enrichment services, rather than taxpayers at large, be used to pay the cost of D&D of the now shuttered facilities. And, indeed, Congress recognized in 2000 the applicability of the USEC Fund to Portsmouth and Paducah D&D.

The USEC Fund is, in fact, one of three funds that total nearly \$5 billion that can be used in this manner. Finally, in this introduction, I want to acknowledge that underpinning all of these priorities is stewardship of the Department as a science and technology powerhouse for the American people, the American economy, with an unparalleled network of 17 national laboratories harnessing innovation to successfully address national security, boost manufacturing competitiveness, mitigate and adapt to climate change, and enhance energy security. And we are working very hard to strengthen the strategic relationship between the Department and our national laboratory network.

I will also mention that starting last year, we highlighted cross-cutting R&D initiatives in the budget. Among these, in this year's request, our largest increases are for grid modernization and for the energy-water nexus initiative. The supporting budget details are provided in the 40-page statement for the record that I asked be inserted into the record. And I will use the rest of my time to describe Mission Innovation in a bit more detail.

The fiscal year 2017 budget includes an increase of 21 percent for clean energy R&D, in the discretionary accounts, supporting the U.S. Mission Innovation pledge. Mission Innovation is an unprecedented global initiative by 20 countries that have pledged to seek to double, public clean energy, research and development over 5 years. The countries represent over 80 percent of global Government investment in clean energy R&D. So this initiative entails a highly leveraged situation for increasing R&D.

Mission Innovation is long overdue. In 2010, the American Energy Innovation Council, a group comprised of CEOs of major American companies from multiple sectors, recommended that the Government triple its investment in clean energy R&D. The council made three key points: Innovation is the essence of America's strength, public investment is critical to generating the discoveries and inventions that form the basis of disruptive energy technologies, and, third, the cost of RD&D are tiny compared with the benefits.

The pledge to seek to double the level of Government investment over 5 years is ambitious but needed. As was mentioned, Bill Gates, who was a leader of the AEIC, has recently met with a number of Members of Congress and has reiterated the need for greatly increased Government-sponsored energy R&D. The objective is to greatly expand the suite of investable opportunities, so opportunities for the investment sector, in clean energy to support economic growth and competitiveness, energy security, clean and affordable energy access, and enabling us and others to meet our environmental goals.

I want to emphasize the scope of Mission Innovation. It spans the entire innovation cycle, from the earliest stage of invention, through initial demonstration, with a weighting towards the earlier stages. It includes all clean energy technologies, renewables, efficiency, nuclear, coal with carbon capture, and enablers, such as the 21st century grid.

It is complemented by another leveraging opportunity, the Breakthrough Energy Coalition, a parallel initiative, launched simultaneously, spearheaded by Bill Gates, including 28 investors from 10 countries, putting billions of dollars on the table, to invest in the new technologies originating from the expanded innovation pipeline in the Mission Innovation countries.

These investors are prepared to be unusually risk tolerant, patient in getting their returns—they talk as long as 20 years in the energy business—and are prepared to take the most promising technologies end to end, of past values of debt, all the way to the marketplace.

I would just single out what was already mentioned, the \$110 million to establish regional clean energy innovation partnerships as not-for-profit consortia, competitively selected, to manage regional clean energy R&D programs focused on the energy needs, policies, resources, and markets of different regions of our country. The program design and portfolio composition for each partnership will be based on our regional priorities and set regionally. As research portfolio managers, not performers, the partnerships will link the resources and capabilities across universities, industry, innovators, investors, and other regional leaders to accelerate the

innovation process and, frankly, to help develop the innovation ecosystems in different regions.

This approach tracks recommendations from the National Research Council's "Rising to the Challenge," which noted that until very recently U.S. Federal agencies have done little to support State and regional innovation cluster initiatives and recommended that, quote, regional innovation cluster initiatives by State and local organizations should be assessed and, where appropriate, be provided with greater funding and expanded geographically.

I will just conclude in saying the Mission Innovation budget proposal also supports increased investments in successful, ongoing innovation programs, such as ARPA-E, Energy Frontier Research Centers, Advanced Manufacturing Centers, Bioenergy Centers, Advanced Transportation Technologies, Advanced Nuclear Reactor Technologies, Next Generation Carbon Capture Technologies, and more.

With that, I will conclude my summary. I thank the subcommittee for its interest and support of our programs and look forward to our discussion. Thank you.

[The prepared statement of Mr. Moniz follows:]



**Testimony of Secretary Ernest Moniz  
U.S. Department of Energy  
Before the  
Subcommittee on Energy and Power  
Committee on Energy and Commerce  
U.S. House of Representatives  
March 2, 2016**

Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the Department of Energy's (DOE) Budget Request for fiscal year (FY) 2017. I appreciate the opportunity to discuss how the Budget Request advances the Department of Energy's missions.

**Advancing Nuclear Security, Science & Energy, and Environmental Cleanup**

The Department of Energy requests \$32.5 billion for FY 2017, an increase of \$2.9 billion from the FY 2016 enacted level of \$29.6 billion. The FY 2017 Budget Request consists of \$30.2 billion in discretionary funding—\$640 million above the FY 2016 enacted appropriation—and \$2.3 billion in new mandatory spending proposals requiring new legislation.

The DOE Budget Request supports a broad portfolio of programs, including support for the National Laboratory system of 17 laboratories to carry out critical responsibilities for America's security and economy in three areas:

- Building the Future through Science and Clean Energy;
- Ensuring Nuclear Security; and
- Organizing, Managing and Modernizing the Department to Better Achieve its Enduring Missions.

Underpinning all of these priorities is stewardship of the Department as a science and technology powerhouse, with an unparalleled network of national laboratories, harnessing innovation to successfully address national security, create jobs and increase economic prosperity, boost manufacturing competitiveness, mitigate and adapt to climate change, and enhance energy security.

Energy has been an important driver for recent U.S. economic growth, due to expanded domestic energy production and reduced petroleum imports; increased energy efficiency and productivity; and significant cost reduction and expanded market application of a variety of clean energy generation and energy-efficient industrial, commercial and consumer energy products. DOE has advanced this technology-based energy revolution by supporting the scientific foundations of energy sciences and technology, clean energy and manufacturing technological innovation, early commercial demonstration and deployments, and new technologies and standards to enhance end use energy efficiency. For example, because of DOE technology successes, favorable policies, and other factors, the cost of utility-scale photovoltaic solar power fell 59 percent and power purchase agreements for wind power fell 66 percent from 2008 to 2014. Yet work remains to enhance energy security and U.S. clean energy competitiveness while enabling global climate goals.

The DOE FY 2017 Budget Request includes a programmatic level of \$12.9 billion for energy, science, and related programs, an increase of \$2.8 billion from the FY 2016 enacted level. The FY 2017 Budget includes \$11.3 billion in discretionary funding—\$1.2 billion above FY 2016—and \$1.6 billion in mandatory spending proposals to support increased investment in leading-edge science and technology; new research facilities to advance the frontiers of science; advanced manufacturing institutes; implementation of the Administration’s strategy for nuclear waste management; and crosscutting initiatives to further technological innovation using an enterprise-wide approach to research efforts. The Budget Request takes steps to implement recommendations from the first installment of the Quadrennial Energy Review (QER), released in 2015, to strengthen U.S. energy infrastructures and enhance our collective energy security.

The Request supports ongoing implementation of the President’s Climate Action Plan and builds on the systems-based analysis of the Quadrennial Technology Review (QTR) released in 2015. The FY 2017 Budget Request also takes a significant first step toward fulfilling the United States’ pledge to seek to double federal clean energy research and development investment over the next five years as part of Mission Innovation, an initiative launched by the U.S. and 19 other countries to accelerate widespread clean energy technology innovation and cost reduction. The Request provides a total of \$5.86 billion in discretionary funding

for clean energy activities that span the full range of research and development from use-inspired basic research to demonstration, representing an increase in discretionary funding of over 21 percent above the FY 2016 baseline of \$4.82 billion. DOE's funding is 76 percent of the \$7.7 billion government-wide Mission Innovation investment in FY 2017.

The FY 2017 Budget Request also includes mandatory funding for clean energy R&D that complements activities supported by discretionary funding. The Request includes \$150 million in mandatory funding for the Advanced Research Projects Agency—Energy (ARPA-E) as part of the ARPA-E Trust proposal that seeks \$1.85 billion in mandatory funding over five years to reliably increase the program's transformational clean energy technology R&D. In addition, as part of the \$1.3 billion mandatory proposal for the DOE portion of the Administration's 21st Century Clean Transportation Plan, the Request includes \$500 million in FY 2017 to scale-up clean transportation R&D through initiatives to accelerate cutting the cost of battery technology; advance the next generation of low carbon biofuels, in particular for intermodal freight and fleets; and establish a mobility systems integration facility to investigate systems level energy implications of vehicle connectivity and automation.

The FY 2017 Budget Request provides a programmatic level of \$12.9 billion for the National Nuclear Security Administration (NNSA), \$357 million above the FY 2016 enacted level, to support DOE's nuclear security responsibilities. The Budget Request includes funding to maintain a safe, secure, and effective nuclear deterrent without underground nuclear explosive testing, including life extension programs for major weapons systems and modernization of the Nation's research and production infrastructure.

The Request also ensures that the United States is ready to respond to nuclear and radiological incidents at home and abroad and supports programs that reduce the threats of nuclear proliferation globally, including supporting implementation and monitoring of the Joint Comprehensive Plan of Action with Iran to verifiably prevent Iran from obtaining nuclear weapons. Finally, DOE's Request for nuclear security supports activities that provide safe and effective propulsion for the U.S. nuclear Navy.

The FY 2017 Budget Request includes \$6.8 billion for Departmental management and performance programs, including environmental cleanup programs to meet the nation's Manhattan Project and Cold War legacy responsibilities. The Request includes \$6.1 billion, which includes \$5.4 billion in discretionary funding and proposes \$674 million in mandatory spending from the United States Enrichment Corporation Fund, to uphold the U.S. Government's commitment to states and communities to remediate the environmental legacy of over six decades of nuclear weapons and nuclear research, development, and production. The Request supports major management reforms, including new project oversight, assessment, and cost estimation initiatives as part of ongoing efforts to strengthen effective project and program management across the enterprise. The Request also supports continued implementation of a new and improved Human Resource Management service delivery business model and efforts to improve information technology management and further strengthen cybersecurity.

### **Science and Energy**

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The FY 2017 Budget Request provides a programmatic level of \$12.9 billion for science, energy, and related programs, which is \$2.8 billion above the FY 2016 enacted level and includes \$11.3 billion in discretionary funding and \$1.6 billion in mandatory spending. The Department's science and energy programs invest in all stages of innovation across a diverse portfolio of clean energy technologies to enhance economic competitiveness in a low-carbon world and secure America's long-term energy security. The Request takes the first step in fulfilling the U.S. Government's pledge to Mission Innovation, an unprecedented global initiative across 20 nations to double public clean energy research and development (R&D), in conjunction with commitments for private investments led by a coalition of 28 private investors from ten countries. The Request also continues to implement the President's Climate Action Plan through the development and deployment of clean energy technologies that reduce carbon pollution. Following COP-21, these investments will be a critical next step in enabling the transition to a low carbon energy future through innovation and cost reduction.

The FY 2017 Budget Request sustains DOE's role as the largest federal sponsor of basic research in the physical sciences and constructs and operates cutting-edge scientific user facilities at the National Laboratories to maintain the nation's

preeminence in science and innovation. The Request supports transformational R&D in critical technology areas, including advanced manufacturing, renewable energy, sustainable transportation, energy efficiency, electricity grid modernization, advanced nuclear reactors, and fossil energy with carbon capture and storage. The Request builds on the analytical foundation provided by the Department's 2015 Quadrennial Technology Review (QTR), as well as the recommendations of the 2015 Quadrennial Energy Review (QER), by funding measures to strengthen U.S. energy infrastructures and enhance our collective energy security posture.

#### **Mission Innovation: Enabling a Clean Energy Future**

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The President's FY 2017 Budget Request takes a significant first step toward fulfilling the U.S. pledge to seek to double federal clean energy research and development investment over the next five years as part of Mission Innovation, an initiative launched by the U.S. and 19 other countries to accelerate widespread clean energy technology innovation and cost reduction. It is a widely-shared view that innovation is essential for economic growth by providing affordable and reliable energy for everyone, is critical for energy security, enhances U.S. competitiveness, and is the key to a transition to a clean energy future. Each of the 20 participating countries, which together represent over 80 percent of global governmental clean energy research and development, will seek to double its governmental investment in clean energy research and development over five years. While each country will determine its own doubling plan and portfolio, the collection of countries will provide new opportunities for synergies and collaboration.

The need for a substantial investment in clean energy research and development is clear. Many studies have examined the contribution of technological innovation to U.S. economic growth. In 2010, the American Energy Innovation Council, comprised of Chief Executive Officers from multiple industries, called for the tripling of energy research and development, citing the need for a dramatic expansion of the energy innovation pipeline to meet critical national priorities. Another report that same year from the President's Council of Advisors on Science and Technology also recommended accelerating the pace of technology innovation to meet economic competitiveness, environmental and energy security needs. The

need for greater regional innovation efforts was highlighted in a 2012 National Research Council report calling for the establishment of regional innovation cluster initiatives that build upon existing knowledge clusters and comparative strengths of a geographic region.

The President's FY 2017 Budget takes a significant first step toward fulfilling the U.S. pledge to seek to double federal clean energy research and development investment over the next 5 years by providing \$7.7 billion across 12 federal agencies, with DOE responsible for approximately 76 percent of that government-wide total. The DOE FY 2017 Request provides a total of \$5.86 billion in discretionary funding for clean energy research and development. This funding represents an increase of over 21 percent above the FY 2016 baseline of \$4.82 billion of appropriated funds.

The Budget supports clean energy activities that span the innovation spectrum from use-inspired basic research to demonstration, and encompasses all clean energy technologies, including renewable energy, energy efficiency, sustainable transportation, nuclear energy, fossil energy, and the electricity grid of the future. The DOE program components supporting Mission Innovation include elements of use-inspired basic research sponsored by the Office of Science, ARPA-E and portions of the applied energy programs that support clean energy research, development, and demonstration activities. Overall, programs supporting Mission Innovation comprise slightly more than half of the total President's FY 2017 Budget Request for science and energy, including ARPA-E.

The increased investments proposed in the FY 2017 Budget support a broad-based strategy for accelerating the innovation process. The strategy emphasizes investments strategically targeted to support innovative platforms for early stage research and technology development, as well as development and demonstration activities that target cost-reduction and advance transformational concepts that can achieve meaningful scale. For example, the President's FY 2017 Budget supports an expansion of promising existing programs, such as Energy Frontier Research Centers, ARPA-E, Clean Energy Manufacturing Institutes, the BioEnergy Research Centers, SuperTruck II, and advanced carbon capture technology pilot projects. The FY 2017 Budget also supports new initiatives, such as \$110 million to establish regional clean energy innovation partnerships, \$45 million to expand

R&D collaborations between innovators and small businesses and the DOE National Laboratories, and an advanced materials crosscutting initiative.

The President's FY 2017 Budget also includes mandatory funding for clean energy R&D that complements activities supported by discretionary funding. The FY 2017 Budget Request includes \$150 million in mandatory funding for ARPA-E as part of the ARPA-E Trust proposal for \$1.85 billion in new mandatory spending authority over five years. The mandatory spending authority will complement annual appropriations by enabling ARPA-E to support projects of a different character than can otherwise be funded under the current program. For example, the mandatory funding will support projects that are larger in scale and address more complex energy challenges that have large transformative potential. As part of the Administration's 21st Century Clean Transportation Plan, the President's FY 2017 Budget Request also includes \$500 million in mandatory funding at DOE in FY 2017 to scale-up clean transportation R&D through initiatives to accelerate cutting the cost of battery technology; advance the next generation of low-carbon biofuels, in particular for intermodal freight and fleets; and establish a smart mobility research center to investigate systems level energy implications of vehicle connectivity and automation.

Mission Innovation investments will be leveraged by private capital that drives innovation and clean energy deployment. The initiative is complemented by a separate private sector-led effort, the Breakthrough Energy Coalition (Coalition), as increased government investment, while necessary, is insufficient by itself. This parallel initiative includes over 28 investors from 10 countries and will supplement the large and growing private sector investment in commercialization of clean energy technologies by targeting new investments at an earlier stage of the innovation cycle and managing these investments through the completion of the innovation process, including the formation of new companies and the commercial introduction of new products and processes. The Coalition will be investing in technologies and projects originating in the Mission Innovation participating countries.

Together, these initiatives will drive innovation essential for economic growth enabled by affordable and reliable energy, for energy security, for U.S. competitiveness, and for a transition to a low carbon energy future.

### **Integrating Science and Energy Programs across the DOE Enterprise**

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The FY 2017 Budget Request further strengthens DOE and its national missions by fully integrating across its science and energy programs, and across the DOE enterprise with the national laboratories as strategic partners.

DOE has continued to strengthen and institutionalize its strategic relationship with the National Laboratories through organizations and forums such as the Laboratory Policy Council, the Laboratory Operations Board, and the annual National Laboratories Big Ideas summits, which convene DOE and the Laboratories on a regular basis. DOE is sustaining this strategic partnership through these ongoing collaborations and through new efforts, such as a comprehensive report on the National Laboratories. The Request also outlines how DOE will implement recommendations of the Secretary of Energy Advisory Board (SEAB) taskforce on the national laboratories and the Commission to Review the Effectiveness of the National Energy Laboratories (CRENEL). Last week, the Department submitted its detailed response to the final CRENEL report that addresses the Commission's findings and recommendations.

The FY 2017 Budget also supports DOE's crosscutting initiatives that leverage the science, technology, and engineering capabilities across programs and National Laboratory partners. DOE first proposed the crosscutting initiatives in FY 2015 to enhance enterprise-wide planning and improve collaboration across organization boundaries for key science and technology areas with impact across DOE's missions. Each crosscutting initiative reflects a comprehensive and integrated work plan to optimize programmatic objectives and efficiently allocate resources. The crosscutting initiatives help bolster DOE's efforts to institutionalize enhanced program management and coordination across program offices, while accelerating progress on key national priorities.

DOE has two years of experience with integrated planning and program management across program offices, enabling accelerated progress on key national priorities. The FY 2015 and FY 2016 appropriations have provided DOE with funding for the crosscutting initiatives, including \$1.1 billion in FY 2016 coordinated across all three Under Secretaries. Moving forward, the FY 2017 Budget Request continues six existing crosscutting initiatives, and proposes a new



initiative, Advanced Materials for Energy Innovation. Together, the initiatives closely coordinate the \$1.5 billion request, a \$330 million increase, in crosscutting R&D across the enterprise in seven technology areas:

- Electricity grid technology modernization accelerates the development of the technologies and tools to enable modernization of the grid to support U.S. economic growth, environmental quality and security objectives.
- Subsurface science, technology, and engineering coordinates efforts to develop next-generation technologies for energy generation, storage, and disposal applications through mastery of the subsurface, with a science-based focus on advanced imaging of geophysical and geochemical signals.
- Supercritical carbon dioxide technology enables large-scale commercialization of the supercritical carbon dioxide (sCO<sub>2</sub>) power cycle, which has the potential for higher thermal efficiencies with lower capital cost compared to steam-based power systems and can provide significant benefits for electric power generation, including reducing the costs of carbon capture and storage.
- Energy-water nexus accelerates the Nation's transition to more resilient and sustainable coupled energy-water systems, including a new effort on desalination technology and regional data, modeling and analysis test beds.
- Exascale computing, a joint Science-NNSA collaboration, significantly accelerates the development and deployment of capable exascale computing systems, applications and software infrastructure to meet national security needs and to provide next-generation tools for scientific discovery;
- Cybersecurity protects the Department of Energy enterprise from a range of cyber threats and improves cybersecurity in the electric power and oil and natural gas subsectors; and
- Advanced materials for energy innovations, which have the potential to revolutionize entire industries by employing advanced synthesis, modeling, and characterization to accelerate and reduce the cost of materials qualification in a wide variety of clean energy applications.

### **Science: Providing the Backbone for Discovery and Innovation**

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DOE's Office of Science is the largest federal sponsor of basic research in the physical sciences, supporting more than 24,000 investigators at over 300 U.S. academic institutions and the DOE laboratories. The Office of Science provides the backbone for discovery and innovation, especially in the physical sciences, for America's research community.

The FY 2017 Budget Request provides \$5.67 billion for Science, \$325 million above the FY 2016 enacted level, to lead basic research in the physical sciences and develop and operate cutting-edge scientific user facilities while strengthening the connection between advances in fundamental science and technology innovation. The FY 2017 Budget Request includes a proposal for \$100 million in mandatory funding for university grants that will be made available through a competitive, merit-based review of proposals solicited from and provided by the university community in the Office of Science mission areas.

The Budget Request provides major increases for advanced scientific computing research, basic energy sciences, and biological and environmental research, and funding to operate the Office of Science's scientific user facilities at optimal levels in support of more than 31,000 researchers from universities, national laboratories, industry, and international partners.

#### **Sustaining Leading-Edge Discovery Science**

The FY 2017 Budget Request sustains leading-edge discovery science through support for the High Energy Physics and Nuclear Physics programs, a 14% increase in investments in Scientific Laboratories Infrastructure, and the new \$100 million mandatory proposal for university grants.

In these discovery science programs, Office of Science has contributed to many major recent accomplishments, including collaborating with two international experiments that led to the Nobel Prize in physics for discovering oscillations in neutrinos (fundamental building blocks of our universe that remain poorly understood); contributing to the discovery of three of the four new superheavy elements in the periodic table; opening the most advanced storage-ring-based light source facility, the National Synchrotron Light Source II (NSLS-II); and

continuing effective execution of major ongoing science construction projects—the Linac Coherent Light Source II (LCLS-II) and the Facility for Rare Isotope Beams (FRIB)—on schedule and within budget.

For High Energy Physics, the request provides \$818 million, \$23 million above the FY 2016 enacted level, to understand how the universe works at its most fundamental level by discovering the most elementary constituents of matter and energy, probing the interactions among them, and exploring the basic nature of space and time. The Request implements activities and projects based on the High Energy Physics Advisory Panel (HEPAP) May 2014 strategic plan, including \$45 million, an increase of \$19 million, to support design for a reconfigured international Long Baseline Neutrino Facility hosted at Fermilab and initial construction for the Deep Underground Neutrino Experiment in South Dakota.

For Nuclear Physics research, the Budget includes \$636 million, \$19 million above the FY 2016 enacted level, to discover, explore, and understand nuclear matter in a variety of different forms, including continued construction of the Facility for Rare Isotope Beams (FRIB).

#### **Expanding Use-Inspired Research**

The Office of Science funds basic science programs that support use-inspired research towards energy and other applications. The Budget Request provides funding to increase operation of the National Laboratory user facilities to optimal levels to accommodate increases in Mission Innovation work. The Request also expands investments in foundations for key technology crosscutting areas, including advanced materials, the subsurface, and the energy-water nexus.

The FY 2017 Budget Request includes \$1.94 billion for Basic Energy Sciences, \$88 million above the FY 2016 enacted level, to provide the foundations for new energy technologies, to mitigate the environmental impacts of energy use, and to support DOE missions in energy, environment, and national security by understanding, predicting, and ultimately controlling matter and energy. The Budget Request provides \$143 million, an increase of \$33 million, to initiate five new Energy Frontier Research Centers (EFRCs) and continue to support the existing EFRCs.

The Request provides \$662 million for Biological and Environmental Research, \$53 million above the FY 2016 enacted level, to support fundamental research and scientific user facilities to achieve a predictive understanding of complex biological, climatic, and environmental systems for a secure and sustainable energy future, including an expanded focus on regional energy-water systems. The Request provides \$90 million, a \$15 million increase, to expand technology transfer activities during the last year of a ten-year program at the three existing Bioenergy Research Centers (BRC). The Request also includes \$10 million for a new initiative in microbiome research that builds on the Department's experience in fundamental genomic science of plants and microbes to understand the fundamental principles governing microbiome interactions in diverse environments.

For Fusion Energy Sciences, the FY 2017 Budget Request includes \$398 million, \$40 million below FY 2016. The Request will continue to support research to understand the behavior of matter at high temperatures and densities and to develop fusion as a future energy source. The Budget Request also includes \$125 million for the U.S. contribution to the ITER project, a major fusion research facility being constructed by an international partnership of seven governments. The Department submitted in mid-February an interim report to Congress on the status of ITER, and we are scheduled to deliver a report in early May with recommendations related to the project.

#### **Investing in High Performance Computing to Support Frontier Science**

The Budget Request provides \$663 million for Advanced Scientific Computing Research (ASCR), \$42 million above the FY 2016 enacted level, to support research in advanced computation, applied mathematics, computer science and networking, as well as development and operation of high-performance computing facilities.

Under this program, DOE has implemented the President's Executive Order on National Strategic Computing Initiative through a multi-year joint program between the Office of Science and NNSA to achieve capable exascale computing. As part of the President's national initiative, DOE announced a \$200 million supercomputer award for Argonne National Laboratory, part of a joint

Collaboration of Oak Ridge, Argonne, and Lawrence Livermore (CORAL) initiative to develop supercomputers that will be five to seven times more powerful than today's fastest systems in the United States.

The FY 2017 Budget includes \$190 million across three Office of Science programs, joined by \$95 million in NNSA, to accelerate development of capable exascale computing systems with a thousand-fold improvement in performance over current high-performance computers in support of the President's National Strategic Computing Initiative. Within the Request, the Office of Science will transition exascale funding to a formal Exascale Computing Project, which will follow DOE project management guidelines under DOE Order 413.3b. The Budget also provides \$46 million to re-compete the SciDAC partnerships, with new activities to include accelerating the development of clean energy technologies.

The Request funds research on high-performance computing applications unique to the biomedical research community, including \$9 million for the President's BRAIN Initiative, in close coordination with the National Institutes of Health. This funding will bring to bear DOE national laboratory capabilities in big data analytics, modeling and simulation and machine learning to support biomedical research challenges in cancer and BRAIN. In other DOE science programs, the Request also enables development of accelerator applications, including advanced proton and ion beams for the treatment of cancer, in coordination with NIH.

### **Energy Research, Development, Demonstration, and Deployment**

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The FY 2017 Budget Request provides a programmatic level of \$6.6 billion for energy research, development, demonstration, and deployment activities, of which \$5.2 billion is discretionary funding—an increase of \$928 million from FY 2016. The Request supports a diverse portfolio of energy technologies, including renewable electricity, energy efficiency and advanced manufacturing, sustainable transportation, fossil energy, nuclear energy, and a modernized grid.

DOE recently completed the 2015 Quadrennial Technology Review (QTR), a systems-based analytical foundation to inform program research priorities across DOE's entire portfolio of energy and science programs by examining the most promising research, development, demonstration, and deployment (RDD&D) opportunities across energy technologies to effectively address the nation's energy

needs. The 2015 QTR builds upon the first QTR conducted in 2011 by describing the nation's energy landscape and the dramatic changes that have taken place over the last four years and identifying the RDD&D activities, opportunities, and pathways forward to help address our national energy challenges.

### **Improving Cost and Performance of Renewable Electricity Technologies**

DOE's FY 2017 Budget Request for Energy Efficiency and Renewable Energy (EERE) invests \$621 million in renewable energy generation technologies, an increase of \$143 million from FY 2016. Innovations, favorable policies, and other factors have led to significant cost and performance improvements across the spectrum of renewable energy technologies, as documented in Revolution...Now<sup>1</sup> report. To name a few examples, the cost of utility-scale photovoltaic solar power fell 59 percent from \$5.70 per watt in 2008 to \$2.34 per watt in 2014; power purchase agreements for wind power fell 66 percent from 7 cents per kilowatt-hour in 2008 to 2.4 cents per kilowatt-hour in 2014; and the median installed price of residential photovoltaic solar power fell 51 percent from \$8.80 per watt in 2008 to \$4.30 per watt in 2014.

The Request provides \$285M, an increase of \$44M, to continue the SunShot Initiative on a path to achieve solar cost parity without subsidies by 2020. The Budget includes \$156 million for Wind Energy, an increase of \$61 million, to continue efforts to achieve a 16.7 cents per kilowatt-hour cost target for offshore wind by 2020, including \$30 million for offshore wind demonstration projects and \$25 million to establish an Offshore Wind R&D Consortium.

The Budget Request provides just under \$100 million, \$29 million above FY 2016, for geothermal technologies, including \$35 million to select the final site and team for FORGE, a field laboratory for enhanced geothermal systems, beginning with a down-selection from five to three teams.

The Request also provides \$80 million for water power technologies, a \$10 million increase, including \$25 million to continue the HydroNEXT initiative focusing on innovative, low-cost water diversion technologies to enable new stream reach hydropower, to progress to a cost target of 10.9 cents per kilowatt-hour by 2020

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<sup>1</sup> <http://energy.gov/sites/prod/files/2015/11/f27/Revolution-Now-11132015.pdf>

from small, low-head new stream developments. The Request also includes \$55 million, \$11 million above FY 2016, to support marine and hydrokinetic technologies, including a grid-connected open-water test facility and development of concepts for revolutionary wave-energy converters.

### **Improving Energy Efficiency and Advanced Manufacturing Technologies**

The FY 2017 Budget for EERE includes \$919 million, \$198 million above FY 2016, to invest in the development of manufacturing technologies and enhanced energy efficiency in our homes, buildings and industries.

In 2015, DOE issued 13 final energy efficiency standards as part of the Administration's goal to reduce carbon pollution. Standards issued to date will achieve cumulative reduction of 2.3 billion metric tons cumulatively by 2030. To accelerate innovation in energy efficiency and manufacturing programs, DOE continues to fund R&D at the Manufacturing Demonstration Facility, funds continuing work at the Critical Materials Institute, and is implementing a total of five Clean Energy Manufacturing Institutes in FY 2016 as part of the National Network for Manufacturing Innovation.

The FY 2017 Budget Request provides \$14 million in EERE for the sixth Clean Energy Manufacturing Institute and \$25 million to establish a new Energy-Water Desalination Hub to serve as a focal point for enabling technologies for de-energizing, de-carbonizing, and reducing the cost of desalination.

The FY 2017 Budget provides \$169 million, an increase of \$83 million, for emerging technologies that reduce building energy consumption, including \$40 million for an R&D effort to transition to refrigerant technologies with low global warming potential, and the Budget provides \$15 million for a new metropolitan systems initiative to use new sensing, communication and computation capabilities to create actionable information for decision-makers on clean energy issues. The Request also provides \$230 million, an increase of \$15 million, to support weatherization retrofits to approximately 35,700 low-income homes nationwide; \$70 million to support state energy offices; and \$26 million for a new Cities, Counties, and Communities Energy Program to provide support to local governments, public housing authorities, non-profits and other stakeholders to catalyze more extensive clean energy investments in revitalization efforts.

### **Advancing Sustainable Transportation**

The FY 2017 Budget provides \$853 million in discretionary funding, \$217 million above FY 2016, for sustainable transportation including vehicle, bioenergy, and hydrogen and fuel cells technologies.

In FY 2016, DOE will achieve high-volume modeled costs for batteries of \$250 per kilowatt-hour—down from the current cost of \$289 per kilowatt-hour—towards a goal of \$125 per kilowatt-hour in 2022 as part of the EV Everywhere Grand Challenge. EERE will initiate SuperTruck II, with up to four new competitively awarded projects to improve freight efficiency of heavy-duty vehicles. The programs will achieve at least 1.15 billion gallons per year savings from Clean Cities' initiatives and fund, with the Departments of Agriculture and Defense, three commercial-scale biorefineries to produce military specification drop-in fuels.

The FY 2107 Budget includes \$469 million for vehicle technologies, \$159 million above FY 2016, including \$60 million to fully fund the multi-year SuperTruck II program to double freight truck efficiency by 2020, and \$283 million, an increase of \$102 million, for continuing the EV Everywhere program to enable domestic production of plug-in electric vehicles that are as affordable and convenient as gasoline vehicles by 2022. The Budget provides \$279 million for bioenergy technologies, \$54 million above FY 2016, including \$52 million to continue R&D efforts on converting cellulosic and algal-based feedstocks to bio-based gasoline and diesel.

The FY 2107 Budget Request includes an additional \$1.3 billion mandatory proposal for DOE to expand investments in low-carbon transportation technologies and fueling infrastructure as part of the Administration's 21st Century Clean Transportation Plan. The proposal for DOE would invest \$500 million in clean transportation R&D, \$750 million in regional fueling infrastructures for low-carbon fuels, and \$85 million in the deployment of clean vehicle fleets for local governments and first responders.



### **Crosscutting Innovation Initiatives for Energy**

The Request for EERE includes \$215 million for new crosscutting innovation initiatives to enable the acceleration of clean energy innovation and commercialization in the United States by strengthening regional clean energy innovation ecosystems, accelerating next-generation clean energy technology pathways, and encouraging clean energy innovation and commercialization collaborations between our National Laboratories and American entrepreneurs.

The Request includes \$110 million to support Regional Energy Innovation Partnerships, a new competition to establish regionally-focused clean energy innovation partnerships around the country. These regionally focused and directed partnerships will support regionally relevant technology-neutral clean energy RD&D needs and opportunities to support accelerated clean energy technology commercialization, economic development, and manufacturing.

The FY 2017 Budget Request also includes \$60 million for a Next-Generation Innovation funding opportunity to accelerate next-generation clean energy technology pathways by supporting research, development, and demonstration (RD&D) projects with the greatest potential to change the trajectory of EERE core program technology pathways. The Request includes \$20 million for a new Small Business Partnerships program to competitively provide technology RD&D resources to small businesses through the DOE's National Labs to support their efforts to commercialize promising new clean energy. The Request also includes \$25 million for Energy Technology Innovation Accelerators that will leverage the technical assets and facilities of the National Laboratories to enable American entrepreneurs to conduct RD&D that leads to the creation of new clean energy businesses.

### **Expanding Transformational ARPA-E Programs**

The FY 2017 Budget Request provides \$500 million for the Advanced Research Projects Agency—Energy (ARPA-E), which fills a unique role in identifying scientific discoveries and cutting-edge inventions and accelerating their translation into technological innovations. Of this, \$350 million is requested in discretionary funding, \$59 million above the FY 2016 enacted level, to fund additional early-

stage innovative programs as well as to exploit the technological opportunities developed in previous ARPA-E programs.

ARPA-E has achieved considerable results to date. Through early 2015, 141 ARPA-E project teams have completed funded work. Thirty four ARPA-E projects attracted more than \$850 million in private sector follow-on funding, and over 30 ARPA-E teams formed new companies. Eight companies had commercial sales of new products resulting from ARPA-E projects, and more than 37 ARPA-E projects partnered with other government entities for further development. At the annual ARPA-E Summit being held this week, we will be announcing updated numbers demonstrating further success with ARPA-E's portfolio of projects.

The FY 2017 Budget Request will expand support for the current core portfolio of early stage innovation programs, including the release of 7-8 funding opportunity announcements (FOA) for new focused technology programs. Possible areas of focus for these FOAs include advanced sensors and analytics for energy management and improved light metals production to transform vehicle light-weighting. The Request also supports the continuation of the Innovative Development In Energy-Related Applied Science (IDEAS) FOA, which provides a continuing opportunity for the rapid support of early-stage applied research to explore innovative new concepts with the potential for transformational and disruptive changes in energy technology. Across all activities, ARPA-E will continue to emphasize supporting commercial readiness for highly successful projects.

In addition, the FY 2017 Budget Request includes a new legislative proposal for the Advanced Research Projects Agency—Energy Trust, which provides \$150 million in FY 2017 and a total of \$1.85 billion in mandatory funds over five years to add a new focus on innovative systems level development that will deliver larger, more rapid benefits to the economic, environmental, and energy security of the United States. These projects are of a different character than can otherwise be funded with annual discretionary appropriations, and include, for example, potentially transformative technologies facing significant technical challenges in scale-up, projects that integrate multiple technical advances, and projects that address system-level transformation of energy cycles. The proposed new

mandatory spending authority will accelerate transformational changes on energy systems.

### **Revitalizing the Nuclear Fuel Cycle**

The FY 2017 Budget Request provides \$994 million for Nuclear Energy, \$8 million above the FY 2016 enacted level, to help meet energy security, proliferation resistance, and climate goals. These funds will support the diverse civilian nuclear energy programs of the U.S. Government, leading federal efforts to research and develop nuclear energy technologies, including generation, safety, waste storage and management, and security technologies.

In 2015, the program funded the second 5-year program of the Consortium for Advanced Simulation of Light Water Reactors (CASL) Hub and new R&D programs for two advanced reactor technologies, pebble bed and chloride fast reactors. The FY 2017 Budget Request provides \$73.5 million for ongoing R&D in advanced reactor technologies and continued R&D support for light water reactors (LWR), \$59 million for accident tolerant fuels, and \$35 million for LWR sustainability. Funding is also requested to continue the GAIN initiative to provide streamlined access for advanced reactor developers to access the world-class nuclear energy R&D capabilities at the national laboratories. The Request includes \$89.6 million to continue funding for a cost-shared cooperative agreement for licensing technical support of a small modular reactor design, including support for a small modular reactor design (SMR) certification application to the Nuclear Regulatory Commission (NRC) by December 2016, for application review by the NRC, and to continue development of permit and license applications for the first domestic SMR deployments.

In 2015, DOE's nuclear energy program awarded a contract for a deep borehole field characterization test and issued an Invitation for Public Comment to initiate the dialogue on a consent-based siting process to support a consolidated commercial used fuel storage, a permanent repository and a separate disposal path for defense waste. The Request continues implementation of the Administration's Strategy for the Management and Disposal of Used Nuclear Fuel and High Level Radioactive Waste by providing \$76.3 million, an increase of \$53.8 million, for integrated waste management system activities in the areas of transportation,

storage, disposal, and consent-based siting. The Request includes \$39.4 million for consent-based siting, including \$25 million for grants to states, Tribes, and local governments. The Request also includes \$26 million to complete characterization of a field test borehole and to initiate drilling.

### **Enabling Fossil Energy to Compete in a Low-Carbon Energy Future**

The Budget Request provides \$600 million for Fossil Energy Research and Development (\$240 million of which is available through repurposing of prior-year balances), \$32 million below the FY 2016 enacted level, to advance research and development in carbon capture and storage, advanced energy systems, cross-cutting areas, and fuel supply impact mitigation.

In FY 2016, DOE is reaching several milestones in its support for carbon capture, utilization and storage (CCUS). DOE completed funding of two large-scale industrial CCUS projects that are in operation to demonstrate the feasibility and economics of carbon capture on an ethanol facility and the technology for carbon capture on a hydrogen production unit. Through cost-shared cooperative agreements, DOE is supporting two large-scale, coal-based CCUS demonstration projects utilizing coal gasification and post-combustion carbon capture technologies, with construction to be completed in 2016.

The FY 2017 Budget Request provides \$50 million, an increase of \$20M, to support initial construction of three large-scale pilot projects of advanced, second generation, post combustion carbon capture technologies critical to reducing cost and increasing efficiency of CCUS technologies. The Request includes \$24 million to initiate the design and construction of a supercritical carbon dioxide (CO<sub>2</sub>) pilot plant test facility at the 10 megawatt-electric (MWe) scale, and \$31 million to initiate design of a natural gas combined cycle (NGCC) demonstration facility employing CCUS technology.

The budget includes the reallocation of funding from CCUS demonstration projects that have not reached financial close to fund other projects and new initiatives, including the use of \$240 million in prior-year balances.

Also in support of CCUS technologies, the President's FY 2017 Budget Request makes available \$5 billion in proposed investment and sequestration tax credits for

qualified commercial CCUS projects. These tax credits are complemented by an existing \$8.5 billion available through DOE's loan guarantees for advanced fossil energy projects to help provide critical financing to support new or significantly improved advanced fossil energy projects, and additional mixed-use authority for loan guarantees in the FY 2017 Budget that can be used for advanced fossil and other technologies.

### **Expanding Technology Commercialization and Deployment**

Significant advances have been made in recent years in commercializing and deploying innovative technologies have been made. In 2015, DOE received 30 out of 100 R&D Magazine awards for outstanding technology developments with promising commercial potential, and the Administration announced new investment commitments from the institutional investment community of \$4 billion for deployment of clean energy technologies. The renewable energy production tax credits were also extended by the Congress in December 2015.

To expand the commercial impact of DOE's portfolio of research, development, demonstration, and deployment activities in the short, medium and long term, DOE established the Office of Technology Transitions (OTT) in 2015 to oversee and advance DOE's technology transfer mission. The FY 2017 Budget Request provides \$8.4 million for the OTT to expand the commercial impact of the DOE portfolio of activities. The Request provides for coordination of technology-to-market activities across the Department and the implementation of the Technology Commercialization Fund (TCF), approximately \$20 million in FY 2017, to catalyze seed-stage funding for collaborations with private sector partners on high potential energy technologies at the National Laboratories. The Budget Request for OTT also supports implementation of the Clean Energy Investment Center (CEIC) to provide better information on investable opportunities resulting from DOE R&D.

DOE's Loan Programs Office, in its role accelerating the domestic commercial deployment of innovative and advanced clean energy technologies, has maintained a financially sound portfolio of loans and loan guarantees. The \$32 billion portfolio of loans, loan guarantees, and conditional commitments has been supported by \$18 billion in financing from project sponsors, and 22 projects with DOE-backed loans

and loan guarantees have now successfully completed construction and initiated operation. DOE has received new applications seeking over \$20 billion in Advanced Technology Vehicles Manufacturing (ATVM) and Title XVII loans and loan guarantees

The FY 2017 Budget Request supports the Department's continued oversight of more than \$30 billion in loans, loan guarantees, and conditional commitments, as well as its administration of remaining loan and loan guarantee authority to finance projects in the areas of advanced nuclear energy, renewable energy and efficient energy, advanced fossil energy, and advanced technology vehicles manufacturing. The FY 2017 Request also proposes an additional \$4 billion of mixed-use loan guarantee authority for innovative energy projects that reduce greenhouse gas emissions.

The FY 2017 Request also includes \$23 million for the Office of Indian Energy, \$7 million above the FY 2016 enacted level, to support DOE's partnership with the Department of the Interior to address the need for clean, sustainable energy systems on Indian lands through expanded technical assistance and grant programs.

#### **Enabling Secure, Modern, and Resilient Energy Infrastructures**

The Department's energy programs also support a secure, modern and resilient energy infrastructure, including for the electric power grid. The FY 2017 Budget Request continues a focus on this mission by providing increased investments in the electricity grid of the future.

DOE has also taken major steps in implementing the Grid Modernization Initiative, supported by a Grid Modernization National Laboratory Consortium comprising 400 partners, including the release of DOE's new comprehensive new Grid Modernization Multi-Year Program Plan and the announcement of a \$220 million funding opportunity for the National Labs and partners.

The FY 2017 Budget Request includes \$262 million for Electricity Delivery and Energy Reliability, \$56 million above the FY 2016 enacted level, for grid modernization research to support a smart, resilient electric grid for the 21st century and the storage technology that underpins it, as well as funding critical emergency response and grid physical security capabilities. The Request provides

\$14 million to establish a new competitively-selected Grid Clean Energy Manufacturing Innovation Institute as a part of the multi-agency National Network for Manufacturing Innovation, to focus on technologies related to critical metals for grid application, and advances will be broadly applicable in multiple industries and markets.

The Request for Electricity Delivery and Energy Reliability also provides \$45 million for energy storage R&D, an increase of \$24 million, and \$30 million for smart grid R&D. To fortify grid security and resilience, the Request includes \$46 million to advance cybersecurity technologies and \$18 million for infrastructure security and energy restoration activities. The Request provides \$15 million for a new state energy assurance program that supports regional and state activities to continually improve energy assurance plans, improve capabilities to characterize energy sector supply disruptions, communicate among the local, state, regional, federal, and industry partners, and identify gaps for use in energy planning and emergency response training programs. The Request also provides \$15 million to launch a new state distribution-level reform program for competitive awards to states to utilize a grid architecture approach to address their system challenges.

The Budget Request also includes \$257 million for the Strategic Petroleum Reserve (SPR), \$45 million above the FY 2016 enacted level, to increase the system's durability and reliability and ensure operational readiness. The Bipartisan Budget Act of 2015 requires the Department to submit to Congress a Strategic Review of the SPR by May, 2016. The Act also authorized DOE, subject to appropriation, to sell up to \$2 billion in SPR oil to fund SPR infrastructure modernization. The results of the SPR Strategic Review will inform SPR infrastructure modernization and shall result in an FY 2017 budget amendment related to SPR modernization.

The FY 2017 Budget Request provides \$31 million for Energy Policy and Systems Analysis to continue serving as a focal point for policy coordination within the Department on the formulation, analysis, and implementation of energy policy and related programmatic options and initiatives that could facilitate the transition to a clean and secure energy economy.

EPSC also serves as the Secretariat of the multi-agency Quadrennial Energy Review (QER), and provides systems analysis to support this Administration's initiative. The Administration expects to complete the second installment of the QER in 2016, focused on the electricity sector.

The Budget Request also includes \$84 million for the power marketing administrations, including the Western Area, Southeastern, Southwestern, and Bonneville Power Administrations.

### **Enhancing Collective Energy Security in Global Energy Markets**

While DOE's work in global energy security is not a major budgetary issue, it is an important issue for the Nation. DOE has pursued an increased global focus on collective energy security—energy security for the United States and its allies—in the last several years.

For example, as part of this effort and supported by our Office of International Affairs, the G-7 recently reached an agreement to enhance cybersecurity assessments of energy systems. The FY 2017 Budget Request supports DOE's efforts to enhance collective energy security by providing \$19 million for the Office of International Affairs, which coordinates the Department's activities to strengthen international energy technology, information and analytical collaborations.

In the area of energy exports, DOE has released a two-part LNG export study for public comment evaluating the impact of increasing LNG exports from 12 billion cubic feet per day (Bcf/d) to 20 Bcf/d. The study will be used in the public interest evaluation of pending applications to export LNG to non-FTA countries. DOE also chaired the International Energy Agency Ministerial resulting in a plan to assess energy security implications of natural gas supply.

Following the North American ministerial in 2014, Canada, Mexico, and the United States have worked together to produce new integrated mapping and information products. The Budget Request for the Energy Information Administration provides \$131 million, a \$9 million increase, to build upon enhancements like these in carrying out EIA's data collection and analysis mission. The increase will provide greater regional detail and analysis of petroleum data,



enhance commercial building energy efficiency data. The Budget will also extend analysis of international data to include Canada-Mexico collaboration and Asia and expand collection of transportation energy consumption data.

### **Nuclear Security**

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The President's 2015 National Security Strategy, the 2010 Nuclear Posture Review (NPR), and the ratification of the New Strategic Arms Reduction Treaty underscored the importance of the DOE's nuclear mission and the lasting mandate for DOE to maintain a safe, secure, and effective stockpile for as long as nuclear weapons exist. DOE advances the President's vision to eliminate and secure nuclear material, reduce nuclear stockpiles, and increase global cooperation.

The FY 2017 Budget Request proposes \$12.9 billion for the National Nuclear Security Administration (NNSA), \$357 million above the FY 2016 enacted level, to invest in our nuclear security by modernizing and maintaining our nuclear security enterprise, refurbishing and extending the life of our nuclear deterrent, reducing the threats of nuclear proliferation, and supporting the safe and reliable operation of our nuclear Navy. As part of an overall focus to modernize nuclear security research and production infrastructure, the overall NNSA budget includes a total of \$1.8 billion in proposed infrastructure investments, including \$575 million for the new Uranium Processing Facility.

The Request for NNSA includes \$413 million for NNSA Federal Salaries and Expenses for the salary, benefits, and support expenses of 1,715 federal full-time equivalents (FTEs) to provide appropriate federal oversight of the nuclear security enterprise responsible for managing and executing NNSA's weapons activities and nonproliferation missions.

### **Stewardship of the Nuclear Deterrent**

August of 2015 marked the 20<sup>th</sup> anniversary of President Bill Clinton's announcement that the United States would pursue negotiations for the Comprehensive Nuclear-Test-Ban Treaty and maintain the U.S. nuclear arsenal without nuclear explosive tests. This was an important milestone for a science-based Stockpile Stewardship Program that successfully pushed the limits of

modern science and engineering to maintain the stockpile without underground nuclear explosive testing.

The FY 2017 Budget Request includes \$9.2 billion for Weapons Activities, \$396 million above the FY 2016 enacted level, to build on these accomplishments as NNSA sustains a credible and effective nuclear deterrent while continuing to reduce the size of the active stockpile. The Budget Request supports the work, as laid out in the Stockpile Stewardship and Management Plan, of the science-based Stockpile Stewardship Program to ensure a safe, secure and effective nuclear stockpile in the absence of underground nuclear explosive testing through a sustained, long-term research program.

NNSA has achieved major accomplishments in that mission, such as substantial progress on its Life Extension Programs (LEPs), including those for the B61-12, W76-1, W80-4, and W88 Alt 370 with conventional high explosive (CHE) refresh. The Inertial Confinement Fusion Ignition and High Yield Program increased the number of experiments, or “shot rate,” at Lawrence Livermore National Laboratory’s National Ignition Facility from 191 in 2014 to 356 in 2015. NNSA received the first hardware delivery for Trinity, NNSA’s next generation high performance computer, and completed the first subproject for the Uranium Processing Facility, Site Readiness, on time and under budget.

The FY 2017 Request includes \$1.3 billion for LEPs and major alterations (Alts), \$38 million above FY 2016. In particular, the Request continues timely execution of the B61-12 LEP and the W80-4 LEP. These are the first two steps in implementing the Nuclear Weapons Council-approved “3+2” strategy to consolidate the stockpile to three ballistic missile warheads and two air delivered systems, reducing the number of weapons in the deployed stockpile and simplifying maintenance requirements.

The Request provides \$223 million to support completing production of the W76 by 2019 and \$616 million to deliver the B61-12 first production unit by 2020. It also supports transitioning the W88 Alt 370 with CHE refresh to Production Engineering in February 2017 with \$281 million and provides \$220 million, an increase of \$25 million, to maintain the schedule of the first production unit for the W80-4 LEP by 2025. The Budget Request also provides \$69 million, \$17 million

above the FY 2016 enacted level, to make progress towards meeting the President's commitment to accelerate dismantlement of retired U. S. nuclear warheads by 20 percent.

The Budget Request for Weapons Activities provides \$2.7 billion for Infrastructure and Operations, \$443 million above FY 2016. The Request ensures no increase in the backlog of deferred maintenance. The Request will dispose of the Kansas City Bannister Federal Complex, and upgrade aging infrastructure to address safety and programmatic risks, improve productivity, and lower operating costs. The Request for Infrastructure and Operations also provides \$575 million, \$145 million above FY 2016, to continue the phased approach for constructing the Uranium Processing Facility, including completion of the design and continued construction on approved subprojects. The request also provides \$160 million to continue work on the Chemistry and Metallurgy Research Replacement project to support the plutonium strategy.

As part of the Office of Science-NNSA collaboration on the Exascale Computing Initiative, the Budget includes \$95 million for exascale computing, \$31 million or 48 percent above FY 2016, to develop exascale-class high performance computing to meet the needs for future assessments, LEPs, and stockpile stewardship.

The Request for Weapons Activities also includes \$283 million for Secure Transportation Asset, \$46 million above FY 2016, to continue asset modernization and workforce capability initiatives including conceptual design and systems prototyping of the new Mobile Guardian Transporter.

#### **Controlling and Eliminating Nuclear Materials Worldwide**

The FY 2017 Budget Request includes \$1.8 billion for Defense Nuclear Nonproliferation, \$132 million below the FY 2016 enacted level, to continue the critical missions of securing or eliminating nuclear and radiological materials worldwide, countering illicit trafficking of these materials, preventing the proliferation of nuclear weapon technologies and expertise, ensuring that the United States remains ready to respond to high consequence nuclear and radiological incidents at home or abroad, and applying technical and policy solutions to solve nonproliferation and arms control challenges around the world. Note that while the overall program level for DNN is down, the programmatic

funding level in the FY 2017 Budget Request is roughly flat with FY 2016 due to the availability of prior-year carryover balances and termination of the Mixed-Oxide (MOX) Fuel Fabrication Facility Project.

DOE has taken major steps in the nuclear threat reduction missions. We recently issued the first nonproliferation strategic plan, *Prevent, Counter and Respond—A Strategic Plan to Reduce Global Nuclear Threats*<sup>2</sup>, to define and describe our missions.

Supported largely by the DNN program and capabilities, we also provided scientific technical analysis to support the U.S. delegation during the Joint Comprehensive Plan of Action (JCPOA) negotiations. Following finalization of the agreement, twenty nine scientific leaders deeply familiar with nuclear issues (familiar names such as Garwin, Drell, Dyson, Hecker, Richter, and others), focusing on the agreement’s nuclear dimensions, wrote to the President: “This is an innovative agreement, with much more stringent constraints than any previously negotiated nonproliferation framework.” These experts were referring to aspects of the agreement such as weaponization constraints and bans on nuclear weapons R&D that mark an unprecedented approach to such agreements—and highlight the critical role that DOE plays in providing unparalleled scientific and technical capabilities.

As part of NNSA’s goal to minimize and, when possible, eliminates weapons-usable nuclear material around the world, we have also recently completed removal or confirmed disposition of fissile nuclear material, bringing the number of countries free of all highly enriched uranium (HEU) to 28, plus Taiwan. We have also down-blended additional HEU to achieve a cumulative total of 150 metric tons of U.S. excess, weapons-usable HEU.

And in the area of nuclear counterterrorism and incident response, NNSA realigned its counterterrorism and counterproliferation functions to more efficiently respond to nuclear or radiological incidents worldwide and to sustain counterterrorism capabilities through innovative technology and policy-driven solutions. The program continues to train and exercise to strengthen emergency

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<sup>2</sup> [http://nnsa.energy.gov/sites/default/files/NPCR%20Report\\_FINAL\\_4-14-15.pdf](http://nnsa.energy.gov/sites/default/files/NPCR%20Report_FINAL_4-14-15.pdf)

preparedness and response capabilities, including nuclear forensics operations, domestically and worldwide.

Looking ahead, the FY 2017 Budget Request will support continued successful execution of the mission to control and eliminate nuclear materials worldwide. NNSA will support the President's fourth and final Nuclear Security Summit in March-April 2016, continuing the President's aim to achieved tangible improvements in the security of nuclear materials and stronger international institutions that support nuclear security.

DOE and its national laboratories will continue to provide technical support to the International Atomic Energy Agency (IAEA), including to implement the JCPOA, and will remain highly engaged in providing training and technologies and other support to support the IAEA. The Request includes \$13 million to support implementation of the JCPOA, including \$10M to support JCPOA material management activities and \$3 million for technical and in-kind support for the U.S. interagency process and the IAEA.

In the area of plutonium disposition, the Budget Request will terminate the Mixed Oxide (MOX) approach and move to a dilute and dispose approach that will be faster and significantly less expensive than the MOX option. Specifically, the FY 2017 Budget Request provides \$270 million, \$70 million below FY 2016, to terminate the MOX Fuel Fabrication Facility, and an additional \$15 million to pursue a dilute and dispose (D&D) approach that will disposition surplus U.S. weapon-grade plutonium by diluting it and disposing of it at a geologic repository. The Department will complete pre-conceptual design for the D&D option and begin conceptual design in late FY 2017.

In other nonproliferation areas, the Request includes \$272 million, \$37 million above FY 2016, to sustain emergency response and nuclear counterterrorism capabilities that are applied against a wide range of high-consequence nuclear or radiological incidents and threats. It proposes \$394 million for the Defense Nuclear Nonproliferation Research and Development program to advance technical capabilities to monitor foreign nuclear weapons program activities, diversion of special nuclear material, and nuclear detonations. The Request provides \$341 million for Material Management and Minimization to support HEU and

plutonium disposition, the conversion of research reactors and medical isotope production facilities from the use of HEU to the use of low enriched uranium (LEU) fuels and targets, and removal of excess HEU and separated plutonium. The Request also provides \$337 million for Global Material Security to build international capacity to secure, and prevent smuggling of, nuclear and radiological material through equipment installations and upgrades, and capacity-building workshops and trainings. In addition, the Request provides \$125 million for the Nonproliferation and Arms Control program to strengthen the nonproliferation and arms control regimes by enhancing international nuclear safeguards; controlling the spread of nuclear material, equipment, technology, and expertise; and verifying nuclear reductions and compliance with nonproliferation and arms control treaties and agreements.

#### **Advancing Navy Nuclear Propulsion**

Finally for NNSA, the Naval Reactors program continues its tradition of providing the design, development and operational support required to provide militarily effective nuclear propulsion plants and ensure their safe, reliable and long-lived operation. In carrying out this mission, the Naval Reactors program has marked many major accomplishments.

The program continues to provide technical support and 24/7 reachback support for the Navy's nuclear fleet of 73 submarines and 10 aircraft carriers. The program successfully achieved criticality in the first reactor of the new Gerald R. Ford-class aircraft carrier, and continued reactor plant design for the Ohio-class submarine replacement and advanced technology development in refueling of S8G land-based prototype reactor, including the insertion of new materials and technology for the Ohio-class submarine replacement. Naval Reactors also operated the MARF (Modifications and Additions to a Reactor Facility) and S8G land-based prototype reactors, delivering 2,832 trained nuclear operators to the fleet—a 17 percent increase over FY 2014.

The Request includes \$1.4 billion for Naval Reactors, an increase of \$45 million from the FY 2016 level, to support U.S. Navy nuclear propulsion. The Request provides \$214 million to continue development of the Ohio-class submarine

replacement reactor, and \$124 million to continue refueling of the Land-Based Prototype reactor.

In support of necessary facilities for handling naval spent nuclear fuel, including the capability to receive, unload, prepare, and package naval spent nuclear fuel, the Request provides \$100 million to complete design and initiate construction of a new Spent Fuel Handling Recapitalization Project at Naval Reactors Facility in Idaho.

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### **Management and Performance**

The FY 2017 Budget Request provides \$6.8 billion for Departmental management, performance, and related corporate support activities to position the Department to meet the nation's Manhattan Project and Cold War legacy responsibilities and to continue institutionalizing an enterprise-wide focus on improving the efficiency and effectiveness of DOE programs through the effective management of DOE's infrastructure and workforce.

#### **Strengthening Project Management**

The Department is aggressively pursuing implementation of a Secretarial initiative to improve project management. We have made progress to that end through several recent initiatives and reforms, including establishing independent project review capabilities within each Under Secretary organization, as well as a central Project Management Risk Committee (PMRC). We have also formalized the role of the Energy Systems Acquisition Advisory Board (ESAAB) and instituted process changes to ensure that the ESAAB takes a proactive role in reviewing major projects. In addition, we established a new independent office on project management oversight and assessments.

It is notable the Government Accountability Office (GAO) has narrowed the focus of its watch list to DOE's major projects, and we continue to work towards improving our implementation of those projects. The Department's continuing goal is to control costs to within 10 percent of the baseline estimate for at least 90 percent of our construction projects.

The FY 2017 Budget Request includes several proposals to further implement these project management improvements. The Request provides \$18 million for the

independent office of Project Management Oversight and Assessments (PMOA). With senior management focus on DOE's total project portfolio, DOE will be able to hold contractors and programs accountable for large and at-risk projects, receiving early warning notifications and quarterly updates.

The Budget Request also includes \$5 million to establish an independent office, similar to that at the Department of Defense, to set cost estimating policy and provide timely unbiased program evaluation analysis and cost estimation.

### **Cleaning up Nuclear Legacy Waste**

The FY 2017 Budget Request includes \$6.1 billion for Environmental Management (EM), \$99 million below the FY 2016 enacted level, to address its responsibilities for the cleanup of large quantities of liquid radioactive waste, spent nuclear fuel, contaminated soil and groundwater, and deactivating and decommissioning excess facilities used by the nation's nuclear weapons program. The \$6.1 billion Request includes \$5.4 billion in discretionary funding and proposes \$674 million in mandatory funding from the USEC Fund, for Uranium Enrichment Decontamination and Decommissioning (UED&D) Fund activities.

While difficult challenges lie ahead with some of our remaining Environmental Management projects, it is important to note that when the program started, there were 107 sites to be closed—and today we have cleaned up all but 16 sites. The remaining sites will not be simple to remediate, but we started with over 3,000 square miles to remediate, and only 300 square miles remain.

In our ongoing efforts to remediate our legacy sites, we have continued construction activities necessary to initiate direct feed of Low Activity Waste (LAW) at Hanford, and we have continued technical issue resolution of the Pretreatment and High Level Waste facilities at the same site. We have cleaned up and demolished more than 800 facilities at Hanford, and we have remediated over 1,200 waste sites along the River Corridor. At the Savannah River Site, we have closed the seventh waste tank, and we have revitalized the EM Technology Development and Deployment Program in response to a Secretary of Energy Advisory Board (SEAB) recommendation.



Looking forward, the FY 2017 Budget Request includes \$271 million to maintain critical progress toward resuming waste emplacement in the underground at the Waste Isolation Pilot Plant (WIPP) by the end of 2016. WIPP, the Nation's only mined geologic repository for the permanent disposal of defense-generated transuranic waste, suspended operations following a February 5, 2014 fire involving an underground vehicle and an unrelated radioactive release that occurred February 14, 2014. The Request for WIPP includes activities to resume waste emplacement operations by the end of 2016, including continued implementation of corrective actions and safety management program improvements, completion of Operational Readiness Reviews and commencement of waste emplacement operations. Activities include mine stabilization, mining, mine habitability activities in all underground areas, continued decontamination of contaminated areas, and upgrades, support for completion of repairs of New Mexico Roads used for the transportation of DOE shipments of transuranic waste to WIPP, and community and regulatory support. The budget supports the Central Characterization Project and maintains shipping capability between the generator sites and WIPP. The Request also includes funding to support progress in design of a new permanent ventilation system that is needed to support normal operations.

The FY 2017 Budget Request provides \$1.5 billion for the Office of River Protection, \$86 million above the FY 2016 enacted level, to support the Department's proposal to amend the Consent Decree between DOE and the State of Washington for completion of the Waste Treatment and Immobilization Plant and retrieval of waste from 19 Single Shell Tanks. The Budget Request would enable construction of a new facility to allow DOE to begin treating low level waste by the end of 2022, avoiding the need to wait for completion of other facilities affected by the technical issues. The Request continues construction of the low activity waste (LAW) facility, the analytical laboratory, and balance of facilities while addressing technical issues with the pretreatment facility and the high-level waste facility as well as support for the planning and design of the LAW pretreatment system at the tank farms.

The Request also provides \$800 million for cleanup of the Richland Site. Cleanup activities include soil and groundwater remediation, facility decontamination and decommissioning, stabilization and disposition of nuclear materials and spent nuclear fuel, and disposition of waste other than the tank waste managed by the

Office of River Protection. The FY 2017 Request for Richland will provide for continued achievement of important cleanup progress required by the Tri-Party Agreement. The Budget Request for Richland supports completion of cleanup at the Plutonium Finishing Plant, planning and initiation of procurement in preparation for cleanup of the 324 site, and other activities. The decrease of \$191 million from FY 2016 is attributed to completed scope and facility modifications to prepare for installation of sludge removal systems for the K West Basin, as well as purchase of the engineered containers for sludge repackaging; and completion of remediation in the 300 area, 100K area and 618-10 trenches.

The Request provides \$1.5 billion, \$111 million above FY 2016, for the Savannah River Site to support remaining construction and commissioning of the Salt Waste Processing Facility, processing 19 million gallons of salt waste and nuclear materials in H-Canyon, and site-wide infrastructure. The Request will ramp up commissioning of the Salt Waste Processing Facility to enable start-up in 2018. The Request devotes significant funding to support the Liquid Tank Waste Management Program, as the liquid waste tanks pose the highest public, worker, and environmental risk at the site. The Request also supports the Savannah River Site to operate H Canyon in a safe and secure manner, provides safe, secure storage for spent (used) nuclear fuel in L-Area, and supports continuity of K-Area operations to include maintaining K-Area to store special nuclear material safely and securely. The increase over FY 2016 provides additional support leading to startup of Salt Waste Processing Facility in 2018; supports tank closure and bulk waste removal activities to meet FY 2016 enforceable milestones; and provides additional funding for Salt Disposal Unit #7 design activities.

The FY 2017 Budget Request includes \$370 million, \$32 million below FY 2016, for the Idaho Site to support key requirements to continue progress in meeting the Idaho Settlement Agreement commitments. The Idaho Cleanup Project is responsible for the treatment, storage, and disposition of a variety of radioactive and hazardous waste streams, including removal and disposition of targeted buried waste sitting above the Snake River Plain Aquifer. The project is also responsible for removing or deactivating unneeded facilities, and removing DOE's inventory of spent (used) nuclear fuel and high-level waste from Idaho. The Request will continue retrieval and processing of transuranic waste via the Advanced Mixed Waste Treatment Project and the Remote-handled Waste Disposition Project. It

will also support continued progress toward closing the tank farm, including continued treatment and disposition of sodium bearing waste and progress toward buried waste exhumation under the Accelerated Retrieval Project. The decrease from the FY 2016 level is attributed to progress in treatment, packaging, and certification of Idaho Settlement Agreement remote-handled transuranic waste, delays in processing waste at the Integrated Waste Treatment Unit, and a one-time funding increase in FY 2016 for procurements.

The FY 2017 Budget Request provides \$391 million for cleanup at the Oak Ridge site, including \$178 million in proposed mandatory funding, to support direct shipments of Uranium Solidification Project material, continue design and construction of the Mercury Treatment Facility, continue contact- and remote-handled debris processing at the Transuranic Waste Processing Facility, and continue the K-27 Decontamination and Decommissioning project. The Request will maintain the facilities in a safe, compliant, and secure manner as well as operate waste management facilities. The Request will continue development of Comprehensive Environmental Response, Compensation and Liability Act documentation for the new On-Site Disposal Facility. The processing of legacy transuranic waste debris will continue at the Transuranic Waste Processing Center and technology maturation and design will continue for the Sludge Processing Facility Buildout project. Additionally, the Request supports direct disposition of Consolidated Edison Uranium Solidification Project material from Building 3019, assuming resolution of stakeholder concerns.

The Budget Request includes \$323 million, including \$258 million in proposed mandatory funding, to support the deactivation and decommissioning project at the Portsmouth Gaseous Diffusion Plant in Piketon, Ohio. In addition to supporting deactivation and decommissioning of gaseous diffusion plant facilities and systems, disposal of waste, small equipment removal, and other related activities, the request also includes funding for design and construction of a potential on-site landfill for the disposal of waste generated from the demolition of the Portsmouth Gaseous Diffusion Plant and associated facilities. In addition, the Request will continue the safe operation of the DUF6 Conversion facility that converts depleted uranium hexafluoride into a more stable depleted uranium oxide form suitable for reuse or disposition. The Request for the Portsmouth is supplemented by

continuing transfers of uranium for cleanup services at the Portsmouth Gaseous Diffusion Plant.

The Request provides \$272 million for the Paducah site, including \$208 million in proposed mandatory funding, for a multifaceted portfolio of processing and cleanup activities. In addition to ongoing environmental cleanup and DUF6 operations, the Budget Request supports activities to continue the environmental remediation and further stabilize the gaseous diffusion plant, including uranium deposit removal, facility modifications, surveillance and maintenance, and activities to remove hazardous materials. The Request supports the design of the Paducah potential On-Site Waste Disposal Facility project, if the project is selected as the appropriate remedy.

The FY 2017 Budget Request includes \$30 million to expand the technology development program through carefully targeted projects to develop and demonstrate new technologies and approaches tailored to the specific contamination issues at individual sites. The FY 2017 Budget Request includes an emphasis on robotics research and development of test beds in support of DOE's cleanup mission.

#### **Refinancing Uranium Enrichment Decontamination and Decommissioning**

Continued progress towards decontaminating, decommissioning, and remediating the former gaseous diffusion uranium enrichment sites, and towards meeting our uranium/thorium reimbursement commitments, remains a priority for DOE. We have made significant strides at the Oak Ridge, Portsmouth, and Paducah sites, but we have an estimated \$22-24 billion in remaining cleanup costs.

Throughout the history of these sites, the government has collected funds from the public and private entities that utilized the enriched uranium produced at the facilities to pay for operation, privatization, and cleanup of these three sites—some provided by utility fees, and others provided by Congress. Three government accounts—Uranium Enrichment Decontamination and Decommissioning Fund, Uranium Supply and Enrichment Activities Account, and the United States Enrichment Corporation (USEC) Fund—hold nearly \$5 billion of these funds.

The FY 2017 Budget Request proposes to make progress on our cleanup missions at Paducah, Portsmouth, and Oak Ridge, and the Title X Uranium/Thorium Reimbursement Program by harnessing some of these funds through a mandatory proposal to make available \$674 million from the United States Enrichment Corporation Fund.

Through the Energy Policy Act of 1992, Congress authorized annual deposits to the Uranium Enrichment Decontamination and Decommissioning (UED&D) Fund from an assessment on nuclear utilities for 15 years—from fiscal years 1993 through 2007. The Budget Request proposes to reinstate these fees to offset proposed new mandatory spending for uranium enrichment cleanup. The Budget also includes \$155 million of defense funding for deposit into the UED&D Fund, reflecting the shared responsibility of both industry and the federal government for these costs.

#### **Investing in Departmental Infrastructure**

The FY 2017 Budget Request supports safe and reliable world class facilities by investing in new infrastructure in all mission areas and establishing a sustainable trajectory for the Department's existing infrastructure.

As part of our effort to manage the enterprise's infrastructure in a sustainable manner to support DOE missions, beginning in FY 2016, we have implemented a policy to halt increases in deferred maintenance across the DOE complex. We have also taken steps to bolster DOE's enterprise-wide inventory by compiling the first uniform assessment of general purpose infrastructure at all National Laboratories and NNSA plants and sites through the National Laboratory Operations Board (LOB), and forming a LOB working group to assess and prioritize the disposition of excess facilities.

Building on these efforts, the FY 2017 Budget Request continues a comprehensive program of infrastructure modernization and improved maintenance across the complex, including expanded funding for general purpose infrastructure projects. The Budget proposes, for example, \$200 million for the disposal of the Kansas City Bannister Federal complex. Finally, we are seeking to improve the energy efficiency and sustainability of government facilities, including use of Energy Savings Performance Contracts.

### **Building and Supporting the Energy Workforce**

DOE's continues to work to attract, manage, train and retain the best workforce to meet its future mission needs.

In support of managing the workforce and hiring new personnel, we have activated two Consolidated Human Resources (HR) Service Centers, at Cincinnati and Oak Ridge, as part of a new service delivery model to consolidate 17 current HR service centers to five, which should allow for a more efficient and effective HR model across DOE. The FY 2017 Budget Request completes the HR Shared Services Centers consolidation and invests in implementing recommendations resulting from a talent management study conducted in FY 2016, which will help to develop a corporate approach to talent acquisition in order to consistently and effectively attract, develop, and retain the best workforce to meet mission needs.

The DOE Office of the Chief Information Officer (CIO) and related offices continue to build the information technology (IT) infrastructure in support of DOE's mission needs. DOE is expanding Multifactor Authentication Program for improved cyber security. The FY 2017 Budget Request strengthens cybersecurity across the enterprise with an investment of \$285 million, an increase of \$23 million across 13 offices and the Working Capital Fund.

The \$93 million FY 2017 Budget Request for CIO, \$20 million above FY 2016, also supports several critical IT improvements, including implementation of Federal Information Technology Acquisition Reform Act (FITARA) requirements to provide a common baseline for roles, responsibilities, requirements, and authorities for the management of IT in federal civilian agencies. The Request also includes efforts to modernize and further secure the Department's IT infrastructure, including core networking layers, data centers, and access technologies.

The Department has established a Labor-Management Forum to further encourage opportunities for collaboration and partnership between contractors and management.

The Department has established the Office of Energy Jobs Development, consolidating ongoing activities across the Department formerly coordinated via the Jobs Strategy Council. The Request includes \$3.7 million to support the office

and to compile survey data and deliver the energy jobs and workforce report that would detail job growth/shifts in the energy and advanced manufacturing industries; fill the gaps that currently exist in data gathering on renewable energy, energy efficiency, and advanced manufacturing jobs; and compile data on energy job skill needs of employers and public agencies.

#### **Advancing DOE's Critical Missions**

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In conclusion, the FY 2017 Budget Request of \$32.5 billion invests in its science and technology capabilities, its workforce, and its critical infrastructure to advance DOE's core missions.

The Request supports the Department's efforts in science and energy to enable a clean energy future through innovative lower-cost energy technologies; to support secure, modern and resilient energy infrastructure and emergency response capabilities; and to provide the backbone for discovery and innovation, especially in the physical sciences, for America's research community.

The Request invests in the Department's nuclear security missions to maintain a safe, secure, and effective nuclear deterrent without nuclear explosive testing; to modernize the nuclear security research and production infrastructure; to reduce global nuclear security threats; and to propel our nuclear Navy.

And the Request continues taking steps to further the Department's management and performance missions to clean up from the Cold War legacy of nuclear weapons production; to manage infrastructure in a sustainable manner to support DOE missions; and to attract, manage, train and retain the best workforce to meet mission needs.

Thank you, and I would be pleased to answer your questions.

Mr. WHITFIELD. Mr. Secretary, thank you for that statement. And at this time, I would like to recognize the gentleman from Texas, Mr. Olson, for 5 minutes.

Mr. OLSON. I thank the Chair. A special welcome, Mr. Secretary, on the anniversary of Texas Independence Day.

Mr. MONIZ. And post primary day.

Mr. OLSON. Yes, sir. As you all know, I work for over 800,000 people, Texans, in the still-exploding suburbs of Houston. When they heard about President Obama's proposal to put a tax of \$10 on a barrel of American crude oil, they all said what the heck, what is he thinking? This is insane.

Now, a good friend and neighbor in the business said if we impose a tax on somebody, let's impose a tax on Saudi Arabia, OPEC, Iran, Russia. I have to know your role in this decision. Were you personally consulted before that proposal was announced?

Mr. MONIZ. I am not free to discuss, you know, internal administration discussions.

Mr. OLSON. Were you involved, I am asking you, were you involved in this decision? Not what the discussions were, were you involved as our Secretary?

Mr. MONIZ. No, but, I mean, the processes that go on involving presidential decisions are confined in the administration.

Mr. OLSON. Was anyone at DOE involved in that decision, anyone at all?

Mr. MONIZ. Well, the same response applies, I am afraid.

Mr. OLSON. OK. I see reports that this will increase pipes that pump, the Obama working poor, of 1 quarter per gallon of gasoline, 1 quarter. How do you think this so-called hit will affect these people? Do you think it will be good, bad? Any idea what is going to happen to the American people if this tax increase if it happens?

Mr. MONIZ. I would just put this in the context, if I may, of the transportation bill discussions that took part at the end of last year. And, of course, it is very good that we got at least a transportation bill for some years. But just to note that I think we all recognize, and had many discussions with Chairman Upton that funding our transportation infrastructure is something that is always there. It is a structural issue we need to address. And given that there has not even been an inflation correction to the traditional support for that fund for a quarter century, all I am saying is we need some kind of structural solution which the Congress will have to re-address now in a few years.

Mr. OLSON. How does this tax impact our global competitive? Are we stronger or weaker with this tax on American crude oil? Any idea?

Mr. MONIZ. Well, again, the extent to which the result is a greatly strengthened infrastructure means that our whole economy will be able to function more efficiently. That was the whole motivation in the end for both security and economy for the highway fund in the first place.

Mr. OLSON. One further question: I have a slide comparing the budget to the applied energy programs, in this 2007 budget, compared to the 2006 enacted budget. There are 17 programs here. Fourteen have increased funds for 2017. Three have decreased funds.



One with the decrease, is the fund for cybersecurity for our grid. It goes down from, let's see, it goes down from \$62 million to \$46 million, a 26 percent decrease, this upcoming year. A few weeks ago, Israel, their administrator confirmed that a cyber attack had threatened their grid. This week, the first of this month, New York Times wrote an article confirming for the first time ever, in the world's history, a successful attack had been carried out, by cyber warfare, to shut down the power grid in Ukraine. It has happened.

We know the Atlantic, Pacific can't protect us from these attacks. And, yet, you want to decrease funding for this necessary thing to keep the grid open, going, going, going. How can you justify cutting funds in this world environment of cyber attacks on grids?

Mr. MONIZ. In fact, our overall cyber program, I will have to get the numbers assembled, is going up. Cybersecurity is a huge focus area for us. It appears in multiple places both in our national security side and our grid side. Frankly, one of the first things I did when I came to the Department was establish a cross-cutting cyber council.

Our Deputy Secretary chairs a group with the utilities that meets I think 3 times a year. Cybersecurity is a major focus. We have given security clearances to select members of that utility community to share information. We are doing multiple exercises with the community. So cyber is actually a major focus area. I think maybe we will have to organize a few pieces together. And we would be happy to come and talk with you.

Mr. OLSON. I hear your words through actions, on Page 38 of your budget document, the third line, you decrease cybersecurity by 26.6 percent. It is right there in your document. I yield back.

Mr. WHITFIELD. The gentleman's time has expired. At this time, I would like to recognize the gentleman from Illinois Mr. Rush, for 5 minutes.

Mr. RUSH. Thank you, Mr. Chairman. Mr. Secretary, I have many questions and few moments. So I would appreciate it if your staff would follow up with my office with specific details on some of the programs and initiatives that you and I have been engaged on.

I would like for them to provide an update on the progress being made with the research labs in terms of their outreach and diversification initiatives. And I would like to see them focus on contracting and vending opportunities at the Argonne National Laboratory and at the Fermi National Laboratory, as well as any other labs you might, that you think might be significant.

I also would like for you to forward information regarding diversity plans in terms of laboratory leadership, hiring practices, as well as providing internships and outreach programs to 10 and 12 schools and minority-serving higher education institutions.

And, finally, I would like to get more information on the minority internship program so that I and others on this committee can ensure that this program is being continually strengthened well within the next administration, regardless of who might or might not be in the White House.

Mr. Secretary, can you speak to the subcommittee on the importance of continuing the work of the MIE initiative, regardless of what administration is in office? And also what type of impact

might the 21st Century Workforce Bill have on the many institutions with its focus on minorities, women, veterans, and displaced coal workers on the energy industry and on those targeted communities as well as on the U.S. economy as a whole?

Mr. MONIZ. Thank you, Mr. Rush. Actually, if I may, first, Mr. Olson, just note that I believe our cyber cross-cut total budget is \$333 million proposed, which is an increase over fiscal year 2016. But we can provide that t.

So if I may go back to the question, first of all, thank you, of course, for your constant support in all of our efforts. If I may mention a few things: Well, first of all, continuing the Minorities in Energy Program, I certainly hope that is something that the next administration does. I think we are gaining traction. I think it is absolutely critical. In fact, as you said, it is minorities in energy, women in energy. It is addressing the jobs opportunities and challenges we have. Veterans, displaced workers, like in coal country, these are all part of our focus area.

Minorities in Energy, I think, is making great progress. In fact, today, as part of that, actually right now, this week, is My Brother's Keeper week at the laboratories. We have 11 laboratories working on that. I might say the lab directors in terms of diversity have really stepped up. It took a little bit of a nudge, but they have really stepped up.

Sixteen out of the seventeen physically attended a full workshop in terms of diversity, with professionals coming in to help, how to go there. And also we think very important is transparency. Some of the labs are posting their employee composition, women and minorities. Sometimes they don't look so good yet. Argonne, for example, is about 15 percent women and 10 percent minorities. Berkeley is about double that in both categories. But I think this idea, this transparency means there is a real commitment to understand where we are and to improve it.

Mr. RUSH. Mr. Secretary, I only have a few minutes—a few seconds left. Would you address the relationship between the coal workers in Appalachia and the urban displaced and out-of-work workers in districts like mine? Because there seems to be a straight line between displaced coal workers in Appalachia and the south side of Chicago and other urban districts. How do you view that relationship?

Mr. MONIZ. I have to say, I don't know the numbers. I don't know quantitatively, although that is a very interesting question. But I can imagine, frankly, there has been a historical pattern of that type in terms of outflow, for example, to major urban centers like Chicago when there have been job losses, job challenges elsewhere.

We are trying to address I would say on both sides, for example, in Chicago specifically, the work of Argonne Laboratory in opening up to minority contractors, et cetera, I think is important.

In coal, the POWER Plus Plan has many, many components where we are trying to help. It is not only DOE, of course, this is administration-wide, Department of Labor, et cetera, providing training opportunities, looking at new economic opportunities. In fact, I would mention, and this is of direct relevance to Kentucky, for example, we formed 2 years ago a jobs strategy council because of the whole dynamic issue of jobs in the energy sector. We are pro-

posing in the fiscal year 2017 budget, that that become, very modestly funded, but become an office, a budget line to establish a function in the Department that is specifically looking at jobs and pulling it together.

Mr. RUSH. I yield back.

Mr. WHITFIELD. At this time, I recognize the gentleman from Michigan, Mr. Upton, for 5 minutes.

Mr. UPTON. Thank you, Mr. Chairman. Secretary Moniz, in 2012 Congress passed the American Medical Isotope Production Act of 2012. And in testimony before this committee in 2009, as that legislation moved through the committee, the Department of Energy's representative projected domestic production facilities that DOE was funding could come online as early as 2013. To date, we know that none of the projects DOE was funding have come online. And a number have been canceled.

I am interested to know what is the status of domestic production facilities? And can you help us really move this forward?

Mr. MONIZ. Yes, particularly for the moly-99 issue, which is the important one, there are three programs that we are supporting with three different technologies. One of them, SHINE, is an accelerator that will use low enriched uranium. General Atomics is developing a technology. And a company called NorthStar Medical Radioisotopes is developing pathways through neutron capture, et cetera. The NorthStar schedule is to go to first production in October of this year. I think General Atomics is looking to 2018. And SHINE is looking to the beginning of 2019. So, over the next 3 years, we should have three different companies coming on with moly-99.

Mr. UPTON. Good. Good. Last week, our Subcommittee on Oversight took testimony that highlighted how critical Cabinet-level leadership, particularly through you, is for the success of DOE and particularly its nuclear security mission. So I know that our committee is going to continue to look carefully at what is necessary to ensure that the Department is managed to meet its nuclear weapons responsibility and structured to ensure that they are executed to their full potential. I just want an assurance from you that if it does require legislative change, if you come to that conclusion, will you be able to provide us the technical assistance to enable for you to get the job done?

Mr. MONIZ. I certainly will, absolutely. If I may just say—

Mr. UPTON. It should be an easy yes.

Mr. MONIZ. Excuse me?

Mr. UPTON. It should be an easy yes.

Mr. MONIZ. The answer is yes. Could I add to the yes?

Mr. UPTON. Yes, you can.

Mr. MONIZ. I just want to note that I would recommend that you might take a look at the letter I wrote to the Congress at the beginning of the Mies-Augustine report, where I spell out very, very clearly our posture with regard to the overarching recommendation of the Mies-Augustine report. And I think that gives you the flavor of the assistance that I would be happy to provide.

Mr. UPTON. Great. I think we put it into the record as well, so all members can see it.

[The information appears at the conclusion of the hearing.]

Mr. UPTON. Thanks, again, for being up here. And, again, as I talked to Chair Murkowski earlier in the week, we are encouraged that they may be able to finish that bill as early as tomorrow. And I look forward to working with you as we work on the conference to get it done.

Mr. MONIZ. And, again, I am happy to provide as much technical assistance as possible to both Chambers.

Mr. UPTON. Thank you.

I yield back.

Mr. WHITFIELD. The gentleman yields back.

At this time, the Chair recognizes the gentleman from New Jersey, Mr. Pallone, for 5 minutes.

Mr. PALLONE. Thank you, Mr. Chairman.

Mr. Secretary, last week, this committee's Subcommittee on Oversight and Investigations held a hearing on two valuable reports by distinguished panels that examined DOE's labs and the Nuclear Security Enterprise. And, in particular, I found the findings of the Congressional Advisory Panel on the Governance of the National Security Enterprise, also known as the Augustine-Mies panel, to be quite sobering. Both the panel and the panel witnesses who testified before our committee reported that the National Nuclear Security Act, which created a separately organized National Nuclear Security Administration within DOE, had not worked as intended. And the panel also reported that this has led to a number of serious structural and cultural problems within the nuclear complex. The panel further concluded that if not addressed, the dysfunctional governance practices could put the entire Nuclear Security Enterprise at risk over the long term.

Obviously, you are familiar with this. So, Mr. Secretary, the panel studied various approaches to fix the problems they found. After evaluating several governance models, the panel concluded that Congress should reintegrate NNSA into DOE, clarify confused authorities, and place the responsibility and accountability for the nuclear mission back on the shoulders of a qualified Secretary.

Mr. Secretary, I know you are familiar with this recommendation. So let me just ask, do you support that recommendation? And why do you think the panel thought it was so important?

Mr. MONIZ. That is a very sophisticated question and challenging. I think the issue is that their primary recommendation, as you said, after evaluating different governance models, to look at the reintegration pathway, was, to be perfectly honest, the opposite of what many thought was going to be the recommendation. Upon looking at it, they found that there were two problems, which I think we are working to overcome, but, you know, in terms of the long term, it might need a congressional look. One is management inefficiencies. But probably most important is the role of a Cabinet member in representing that mission at the highest levels. And I do serve on the nuclear national security subgroup of the National Security Council, for example.

So what they found was that I think an unintended consequence of the legislation is that, to be perfectly honest, the Armed Services Committees do not spend as much time, shall we say, with the Secretary anymore. So I think that is really the point. By the way, I should say the President has appointed four people, frankly—me;

Deputy Secretary Sherwood-Randall; General Klotz, NNSA Administrator; and Madelyn Creedon, the Deputy, the four leadership positions—with substantial national security experience. But the question is, What is going to happen over time? And that is where I would certainly invite the discussion.

Mr. PALLONE. All right. Well, I just want you to know that the committee intends to continue its bipartisan oversight into how we can make the Nuclear Enterprise function more effective and efficient. And we certainly intend to further examine the panel recommendations and hope to work closely with you to strengthen this critical national security endeavor.

And I did want to thank you, you know, for all you have done as Secretary. I think your work on the nuclear negotiations with Iran, among other efforts, demonstrate how you are precisely the type of qualified Secretary that the Augustine-Mies panel discussed. Thank you.

I yield back, Mr. Chairman.

Mr. WHITFIELD. The gentleman yields back.

At this time, I will recognize the gentleman from Illinois, Mr. Shimkus, for 5 minutes.

Mr. SHIMKUS. Thank you, Mr. Chairman.

Welcome, Mr. Secretary. We are both getting old. We both have reading glasses now. It is good to have you.

On Monday, Chairman Upton and I requested that the Government Accountability Office assess DOE's plan to resume consideration of the Yucca Mountain license application, including assuring DOE maintains the necessary infrastructure, contractors, personnel to assure that the Yucca Mountain project can resume. Do I have your commitment that the Department will cooperate in good faith with the GAO as they conduct this review?

Mr. MONIZ. We will always cooperate with Congress and the GAO.

Mr. SHIMKUS. Do you commit that the Department will not take any unilateral actions that will set back the Yucca program further, including anything to alter the physical structure or by allowing contracts that support the Yucca Mountain project to lapse?

Mr. MONIZ. I don't know exactly the situation of that contract that you are referring to. I would have to get back to you for the record.

Mr. SHIMKUS. Please do. Because, as you know, I monitor this as closely as I can.

Mr. MONIZ. Yes, sir.

Mr. SHIMKUS. Now I want to move to boreholes for a second. You have strongly advocated for the development of boreholes to dispose of a small amount of DOE's inventory of defense nuclear waste. This initiative is concurrent to your initiative to develop a, quote-unquote, "consent-based" siting process, which, as you know, contradicts the Nuclear Waste Policy Act—contradicts, or it is not in compliance with. There is no provision for this in the current law.

In January, you, DOE announced it was awarding a contract to drill a test borehole in North Dakota. I am sure you are aware that there has been substantial public pushback on that project. I would like to ask a couple of questions about boreholes and your proposal for consent-based siting. In the interest of time, if you can, you

know, I would like a yes or no so I can get—there are only about four or five of them here.

Are you aware of the Office of Nuclear Waste Negotiator that was established by the Nuclear Waste Policy Act?

Mr. MONIZ. Yes. I am aware of it.

Mr. SHIMKUS. Are you aware that the negotiator made available funding to study the potential of interim storage nuclear waste storage facilities? They did—

Mr. MONIZ. Historically. Historically, to start with.

Mr. SHIMKUS. Are you aware that in 1991—1991—county commissioners in Grant County, North Dakota, applied for these grants?

Mr. MONIZ. No, I was not aware of that.

Mr. SHIMKUS. OK. But they did. Are you aware that after applying for the DOE grants, all the county commissioners were recalled by their constituents?

Mr. MONIZ. Well—

Mr. SHIMKUS. They were. Based on historical experience in North Dakota, why did you choose to even try to award a grant to a North Dakota-based team?

Mr. MONIZ. Well, obviously, I wasn't involved in the selection. But there was a competition. There were a number of proposals. And the scientific review team felt that this was scientifically a very good place. And, of course, we are now working in terms of another location that is appropriate.

Mr. SHIMKUS. Well, it is important because, as you probably know, yesterday the Pierce County commission in North Dakota unanimously rejected your borehole project. How does this now impact your deep borehole proposal?

Mr. MONIZ. Well, as I said, it is actually in the contract that if for any reason the site is unavailable, that we will have another site. And that work has been going on now since the initial problems—

Mr. SHIMKUS. OK. Here is my problem. When I taught high school, the executive branch, per the Constitution, is designed to enforce the laws of the land. We do that telling kids that they have agencies and Secretaries that help enforce the law. It is unfortunate that you have been part of an administration that is not enforcing the Nuclear Waste Policy Act. And it is subverting the intent of the law. And it is particularly troubling in that this, quote-unquote, "consent-based" process, which you use to discourage, attack, obfuscate the long-term location of Yucca Mountain and use a State-based discussion where you now talk about boreholes, you try to ram it through county-based organizations without even a State-based discussion. So the Department of Energy continues to hypocritically move to obfuscate, delay, break the law. And I wish, for the sake of the republic, that the administration would abide by the law.

And I yield back.

Mr. MONIZ. Chairman, may I respond? It is a very important point.

Mr. WHITFIELD. Yes.

Mr. MONIZ. First of all, as we have said before, we are following the law. But I want to specifically address—

Mr. SHIMKUS. Mr. Chairman—you are not following the law. The Nuclear Waste Policy Act is pretty clear: There is no authority for interim storage or interim sites.

Mr. MONIZ. And that is why we don't have the interim storage site.

Mr. SHIMKUS. The Nuclear Policy Act is a conjunction of both spent fuel and defense waste. There is no bifurcation of where nuclear waste goes.

Mr. MONIZ. Well, may I just focus on the——

Mr. SHIMKUS. If you are going to spend additional time, then I will spend additional time.

Mr. RUSH. Mr. Chairman?

Mr. WHITFIELD. Yes, Mr. Rush.

Mr. RUSH. You granted the Secretary's request to respond. So I think we should allow him to respond.

Mr. SHIMKUS. Would my colleague yield?

Mr. RUSH. No. I want to——

Mr. SHIMKUS. Your questions were about wouldn't—the administration following the law on minority hiring. And we have an administration that is not following the law from a different administration. It is hypocritical. And it is wrong.

Mr. RUSH. Mr. Chairman, will we allow Mr. Secretary to answer the question and to respond to the question? That is the reason why you granted him the time. So please allow him to respond without any interference from any member of the subcommittee.

Mr. WHITFIELD. Well, let me just say that I think Mr. Shimkus raised an important point. I know there is legal action on this as well.

Mr. Secretary has asked for an opportunity to respond, so I will grant him that opportunity.

Mr. MONIZ. Thank you, Mr. Chairman.

I will just respond narrowly to the North Dakota borehole. That's all I was responding to. I want to emphasize that the statement that this somehow is not consistent with a consent-based approach does not apply. This is not a nuclear facility. This is a scientific experiment which clearly may have, depending upon results and where analysis goes, may have implications as a useful high-level waste disposal approach. It also may be useful for engineered geothermal systems. This is a science experiment. It did not have any consent-based process. And we never do that for grants for science experiments. So it is apples and oranges.

Mr. WHITFIELD. OK.

At this time, I recognize the gentleman from California, Mr. McNerney, for 5 minutes.

Mr. MCNERNEY. Thank you, Mr. Chairman.

Thank you for coming to see us, Mr. Secretary.

I share my colleague from Illinois' concern about the nuclear waste lack of progress and the urgency to move forward on that. Are you still required to recuse yourself from questions on fusion?

Mr. MONIZ. No.

Mr. MCNERNEY. Good. Well, the superconductor technology advancements have presumably increased the progress of fusion. Could you talk about where we are with that fusion research? Is

there any sort of timeframe where we can expect to see good results and maybe commercialization?

Mr. MONIZ. Well, we are still, certainly in terms of the large tokamak approaches, we are still quite some ways away. The ITER project, which is at a critical point—we need to have a report to Congress on May 2—it has new leadership, by the way, which has really, I think, improved dramatically the project. But even with their new plan, they are talking about first plasma at the earliest in 2025, but deuterium-tritium only into the 2030s. So that is just even to begin on the big ITER experiment. Domestically, we are continuing the work at Princeton and in San Diego. The MIT program shuts down this fiscal year, which accounts for some of the decrease in the budget.

Now, what is interesting is how in nuclear, both fission and fusion, there is a lot of innovation going on in the private sector, including in California. I cannot guess when this might become commercially feasible. But there is a lot of both building major demonstrations, like ITER, like what is going on in Germany, Princeton, California, but also with novel concepts.

Mr. MCNERNEY. Well, I am eternally optimistic—

Mr. MONIZ. I am sorry, and another thing is our ARPA-E program, which takes risky technologies, also issued grants last year to novel fusion ideas that would operate in some intermediate density range, which we can come and discuss with you if you would like.

Mr. MCNERNEY. I would like to ask you about the DOE's effort to expand work on the water-to-energy nexus. What are the Department's priorities in that regard? And I am developing legislation sort of parallel to that, so I am kind of interested in this subject.

Mr. MONIZ. Yes. Well, this is one of—our two biggest increases, I said earlier, for our crosscutting activities are grid modernization and energy-water. The energy-water, we are proposing roughly a tripling of the budget. We think the more you look at it, the more important it becomes. And it would be very wide-ranging, everything from competing for a new desalination hub to research and system analysis for things like wastewater treatment and the like. So it would be a pretty comprehensive program. The last thing I will just say on that is I don't know if this will materialize, but just 2 weeks ago, when Minister Steinitz was here from Israel, where they are very advanced in managing water, we are talking about the possibility of strong collaboration there.

Mr. MCNERNEY. Well, we should collaborate as well in our offices.

Mr. MONIZ. Great.

Mr. MCNERNEY. I want to talk about carbon capture and sequestration. The technology has had some setbacks. I think one of the projects canceled. But, in my opinion, the coal industry, mining, coal burning in the future is going to depend on some sort of carbon capture and sequestration. Do you share that view that the future of the coal industry depends upon a good carbon capture and sequestration?

Mr. MONIZ. Absolutely. And I would note some good news, actually. There are three major projects, a megaton of CO<sub>2</sub> per year



scale, one that we have helped support in the United States. One is in Texas. It is Air Products. So these are industrial facilities. That has been operating for 3 years. The second one in Illinois, ADM, that probably will start within a month. And third is a coal project, coal power plant in Texas, again, Petra Nova, which will start probably in a year or so, maybe a bit less. So those are all going forward.

Also, I want to emphasize: In the budget, we also propose new smallish scale pilot plants to look at novel technologies like oxy combustion and chemical looping. And we also are reproposing to the Congress what would ultimately be about a \$5 billion set of tax incentives for carbon capture and sequestration.

Mr. MCNERNEY. All right. Thank you, Mr. Secretary.

I yield back.

Mr. WHITFIELD. The gentleman's time has expired.

At this time, the Chair recognizes the gentleman from Ohio, Mr. Latta, for 5 minutes.

Mr. LATTA. Thank you, Mr. Chairman.

And, Mr. Secretary, good to have you back before us in the committee. Mr. Secretary, in order to develop the next generation of advanced nuclear technologies, private industry, the Department of Energy nuclear research activities, and the NRC have all aligned efforts to research, demonstrate, and license advanced nuclear technologies. I am drafting legislation to examine the nexus between DOE's nuclear research programs and the NRC's licensing capabilities, and earlier this week, my office sent over the discussion draft. And I look forward to your department reviewing it with technical comments. I would like to ask, how is DOE communicating with NRC to provide a pathway for your research activities to be carried through the NRC's licensing process?

Mr. MONIZ. First of all, of course, we would be delighted to help with assistance on your draft. With the NRC, there are several things. One is, I should say, this is not advanced—and this is not for novel reactors, but we have from the beginning had NRC directly engaged in our nuclear simulation hub at Oak Ridge, because in the end, the products of that will be very important for licensing of at least evolutionary new technologies. In terms of alternatives, we have a workshop coming up—I believe coming up, or maybe it already happened—with NRC in terms of more advanced non-light water reactor technologies. We are funding two companies, company-led consortia: one to develop pebble bed reactors and one to develop molten salt reactors. We are in very strong communication with NRC, because I think you put your finger on something that is critically important. If they are not involved early on in the work, then the regulatory process could go on much, much longer.

Mr. LATTA. Thank you.

And if I could kind of switch over to cybersecurity, because as you know, here on the committee we have had multiple hearings, especially when we are talking about how the infrastructure could be affected by cyber attacks. I served on a couple different cybersecurity task forces. And what is the Department's strategy for addressing potential cybersecurity challenges presented by existing and future grid and energy infrastructure technologies? And

one of the things also I would like to ask is, because I am looking at it on your budget, it shows a decrease from about \$62 million to \$46 million this year for cybersecurity for energy delivery systems. So you had a decrease. And so our concern is we want to make sure that we are beefing up. And I know, across not only my district or the State of Ohio but across the country, there is always that great concern as to what is happening on the cyber side because of how vulnerable we could be to an attack.

Mr. MONIZ. That is one budget line. As I said earlier, if you actually look at our cyber cross-cut, I have to say, it is not a major increase, but we do have an increase proposed for our cyber cross-cut. We are working in the technology space, but we are also carrying out a number of other activities with the energy infrastructure people, with the heads of utilities.

Mr. LATTA. Could you just kind of go into detail what that might be, what some of those might be that you are working on?

Mr. MONIZ. Perhaps we could come by and have some people come to your office and describe that in detail. But, for example, the Deputy Secretary, again, convenes regularly a group specifically on energy infrastructure protection. Cyber is a big part of that. I can say it involves people like Tom Kuhn, the head of EEI. On the private utility side, the chair of that now is Tom Fanning, the head of Southern Company. And there are quite a few others. And they are engaged in table top exercises that we run. Because they have been given some clearances, they are briefed on some cyber attacks and what are best practices to try to avoid that. The fact is, I mean, you know, cross your fingers, obviously, the intensity of cyber attacks on U.S. energy infrastructure is certainly increasing year by year. So far, we have not had a major hit. But we have seen in other parts of the world, there have been some pretty serious cyber hits. And so we are always looking into those. Frankly, we had a team in Ukraine after their incident, analyzing that and sharing that with our utility leaders, for example.

Mr. LATTA. Thank you very much.

Mr. MONIZ. We could say more in a different context.

Mr. LATTA. Thank you.

Mr. Chairman, I see my time has expired, and I yield back.

Mr. WHITFIELD. The Chair now recognizes the gentleman from Iowa, Mr. Loeb sack, for 5 minutes.

Mr. LOEBSACK. Thank you, Mr. Chair.

Good to see you, Mr. Secretary, as always. Thanks for taking the time to come and testify today. I do want to add my thanks for your work on the Iran deal. I thought that was really wonderful on your part, all the effort you put in. I want to focus a little bit on renewable energy today. As you might imagine, I am from Iowa, got some thoughts about that. As you know, recent data from the U.S. Information Administration showed that Iowa now is the first and the only State in the Nation to generate more than 30 percent of its energy from wind power. Last year, we hit 31 percent. I am very proud of that. Something I bring up quite often in these fora. It is great news, not only for my home State but, of course, for the Nation's renewable energy sector. When we invest, I think we can all agree, when we invest in renewable energy, like solar and wind, we do lower our dependence on foreign oil, and we rein in CO<sub>2</sub>

emission. In fact, last week, your agency released a report stating that the wind production tax credit, which I am thankful we got extended for 5 years—

Mr. MONIZ. We are, too.

Mr. LOEBSACK [continuing]. And solar investment credit, the investment tax credit, will drive a net increase of 48 to 53 gigawatts of energy from renewable sources by 2020. And these investments not only do help to produce clean energy, more clean energy, but they also help to produce thousands of jobs. And I was happy to push as hard as I could for both of those tax credits. We got 5 years for each, as you know.

You also know that my State is a leader on biofuels. You are very aware of that. And along with your agency's bioenergy technology program, which develops and advances America's energy future, it has positively affected I think our domestic energy sources. And I thank you for all the great work you have done there. I also note that U.S. Department of Agriculture, under the leadership of Tom Vilsack, our former Governor, has already made investments in terms of infrastructure through the biofuels infrastructure program.

But I am going to introduce a bill later today to help Americans have a greater choice at the pump. And that has already been done to some extent through the BIP program, and I am very appreciative of what USDA has done on that front. But I think we have got to go further. My bill is the REFUEL Act, Renewable Fuel Utilization, Expansion and Leadership Act. And it will create new and retrofit existing infrastructure, including pumps for biofuels and hydrogen, tanks, piping, and electric vehicle chargers. Too often, I think we have got infrastructure constraints out there. I know a lot of this has to do with USDA, not necessarily with DOE, but it is something that I still want to bring up, make sure that folks know that this act I think is going to help bridge the divide by making important investments in the infrastructure needed to provide consumers with choices at the pump. I am going to come back to that.

But I first want to ask you—because that will be my second question, if you see any more opportunities on the part of the administration to advance the infrastructure aspect of this. But the first question has to do with the budget of DOE in terms of energy efficiency and renewable energy programs that the President has requested \$156 million for the wind energy program. And I support that fully, as you might imagine. But, last year, roughly \$4 million was set aside for distributed wind energy, something that we really don't talk that much about. We talk about the big projects, projects that MidAmerican Energy is doing, for example, in Iowa. But this type of wind energy I think is particularly important to my constituents and throughout the country. And I am curious to know if you plan to invest more in distributed wind, and if so, what are you hoping to achieve with the greater investment?

Mr. MONIZ. Well, thank you, and by the way, I will be in Iowa in the beginning of May.

Mr. LOEBSACK. Fantastic.

Mr. MONIZ. That will be great.

There are many directions in wind that remain very, very interesting for development. I will come to the distributed, but I would

also note that a report last year noted how really pushing to higher hub heights could be a major—open up major resources. Of course, there is the offshore wind that we are still working to try to get costs down. There are really more unusual options, like ARPA-E funded something called a flying wind turbine, which would go to a thousand feet. But distributed wind, I completely agree with you, has been kind of sometimes lost in the shuffle. And I think part of it is also one is not never quite clear what one is talking about with distributed wind.

Mr. LOEBSACK. I understand.

Mr. MONIZ. Should it be defined in terms of scale of the wind, or is it just where it happens? It could be a large wind turbine that happens to be close to the load. So I think it is pretty complicated. I believe this year, in fiscal year 2017, we do continue distributed wind. It is at a modest scale; it is \$4.5 million or something like that, but something we would be happy to discuss more with you.

Mr. LOEBSACK. Thank you. I do appreciate that. I have run out of time, but I will submit another question for the record having to do with infrastructure.

Thank you, Mr. Chairman.

Mr. WHITFIELD. The Chair now recognizes the gentleman from West Virginia, Mr. McKinley, for 5 minutes.

Mr. MCKINLEY. Thank you, Mr. Chairman.

And, Secretary, just to get started on a series of questions, but the first one—

Mr. MONIZ. I am having a hard time hearing you.

Mr. MCKINLEY. First question, just a yes or no, if you could, before I get into a little bit more meat. With the NETL facility, now that the CRENEL Commission has made a recommendation that we go from a GOGO to a GOCO, do you support their final decision, or are you going to maintain it as Government-owned, Government-operated?

Mr. MONIZ. No. I have answered that in the past, and the answer is the same, that we will continue with the GOGO arrangement.

Mr. MCKINLEY. Thank you. That gives some assurance to everyone. The earlier statement from Chairman Whitfield that he was concerned about the direction of the Department, DOE—and I share that, because I think that the focus has been trying to force the existing coal-fired powerplants to add carbon capture and storage as an after-market retrofit, even though virtually every nation on the globe has turned their backs on CCS. Yes, they will do it in research, but they are not going to force it like we are. So it seems that DOE is really hell-bent on pushing CCS. Even China and India, for example, they are not forcing CCS on their facilities, but rather, they are, as you know—I assume you know—they are building new high-efficiency coal-fired powerplants instead of CCS.

We recognize that energy efficiency is the best short-term solution to our emission controls, and CCS is a long-term solution to this. And the President has said, as recently as back in February, the carbon capture is just really expensive right now. So I don't understand why DOE continues to chase this rabbit, I think the wrong rabbit, of pushing CCS on our utilities when they should be encouraging high-efficiency facilities.

Now, just some quick examples. Our two most efficient powerplants in America—Turk in Arkansas and Longview in West Virginia; one an ultra-supercritical and the other one being just an advanced supercritical—they are built at half—at half—the cost of Kemper. So it just kind of makes me think about—it feels like DOE is trying to retrofit pushing in a \$50,000 engine into an old car instead of just buying a new car. It is just simply we keep trying to make people retrofit, because you put up so many roadblocks, other people in the administration, in building new coal-fired powerplants.

So shouldn't the DOE switch its priorities? Or what would be the problem with switching its priorities so that we would be more focused on the high-efficiency, low-carbon-emitting, advanced supercritical and advanced supercritical plants across this country? Are we missing something? Why aren't we doing the one that is more immediate that we can get some success with?

Mr. MONIZ. Well, first of all, of course, I completely agree with your focus on energy efficiency as critical. That is a given. And by the way, I would say that, with India, you are certainly correct; India is not pursuing CCS. But China actually is.

Mr. MCKINLEY. I just came back from China in October, and the NEA in China said they are not going to promote CCS. We had that very clear in our meetings with him. They said it is too expensive; they are not going to do it.

Mr. MONIZ. Well, I will be there in a couple weeks, and I will check in. The last time we met with them, which was recently, they said the opposite. OK.

Whatever the case, in terms of our program, obviously, look, our main focus at DOE is in the kind of the technology development and RDD&D with the long-term view, preparing options for the future. We don't make, in the end, the marketplace choices.

Mr. MCKINLEY. Could we not be developing with fluidized bed combustion using calcium oxide as an additive in the formula? That is a very economical solution that other people are looking at. It is one with fluidized bed; you can use some pretty low-grade coal. That is one of the things that China said they were considering using it because they don't have the same quality coal that we have here in America. Now, I am running out of time on this.

Could I just make sure that I ask at the very end, could we get you to come to Longview and see the tremendous efficiency that is operating there without CCS, and how effective they have been able to do that at half the cost of a CCS facility? Would you be willing to go?

Mr. MONIZ. I am sorry; where is Longview?

Mr. MCKINLEY. Three and a half hours away.

Mr. MONIZ. No, is it in West Virginia?

Mr. MCKINLEY. Yes, it is. Maybe when you and I get to NETL again—

Mr. MONIZ. What I have said is, I would definitely like to get to West Virginia.

Mr. MCKINLEY. It is within a stone's throw of NETL facility that we could go to—

Mr. MONIZ. Congressman, I would like to go to West Virginia, and we will work on the itinerary.

Mr. MCKINLEY. Thank you very much. I appreciate it.

Mr. MONIZ. But I would just add, if I may, I won't go into detail, but we do have a bunch of R&D going on that is quite relevant to higher efficiency coal plants: supercritical CO<sub>2</sub> cycles, advanced materials that you need to go to higher temperatures and the like. We can discuss that.

Mr. MCKINLEY. I am told from the people there it is sort of a drop in the bucket. It is more window dressing than sincere. So you and I can have more of a conversation.

Mr. MONIZ. We can discuss that. But we have a substantial increase in the supercritical CO<sub>2</sub> cycle, for example.

Mr. OLSON [presiding]. The gentleman's time has expired.

The Chair recognizes the gentlelady from Florida, Ms. Castor, for 5 minutes.

Ms. CASTOR. Thank you, Mr. Chairman.

Welcome, Mr. Secretary. It is good to have you here.

Could you please provide the committee with an overview and your outlook on how we are doing on reducing carbon pollution? How are we doing here in the United States? What are our challenges and opportunities? And after the Paris agreement, give us a short sketch of the world community and whether or not you have seen countries begin to implement their commitments.

Mr. MONIZ. Yes. Well, overall, if you look over the last years, we are doing quite well in CO<sub>2</sub>. This last year, we did have a little bit of an increase. Low oil prices had something of an effect. But, overall, we would say we are still on track for being about 17 percent lower CO<sub>2</sub> in 2020 relative to 2005, which was the first target for us to hit. So that is going on, but it will mean continuing to push. In fact, following on Mr. McKinley's question, certainly on the demand side, the efficiency side will be absolutely critical for maintaining the momentum.

Internationally, I think if you look at the major emitters, of course, the EU as a whole is making tremendous progress. China is the largest individual emitter, and they are making progress as well. And, of course, they have also announced—we will see what the implementation plan is—but they have announced a cap-and-trade system to put into place, actually I think later on this year or maybe next year.

So I think countries are taking this quite seriously. In fact, I would argue that the progress made in Paris was enabled by things like the U.S.-China announcement. But they had impact only because both countries were actually walking the talk.

Ms. CASTOR. And I understand here in the U.S. that, even with the hiccup on the Clean Power Plan at the Supreme Court, still, utilities overall and States and communities are moving toward the carbon reduction goals in any event because they know it is critical to the future of our country. Is that your understanding, too, that the markets are changing; the market for clean energy innovative solutions is growing at this time?

Mr. MONIZ. Absolutely. Again, I would just reiterate what you implied, the Supreme Court ruling was simply a stay; it was not a judgment, obviously, on the plan. And we feel pretty confident about it. But independent of that, it is not uniform, but many

States and utilities are continuing with their planning for implementation because, frankly—and look, much of industry is acting already in the conviction that there will be increasing constraints on carbon emissions. In fact, for years, some of the major companies have included that in their capital planning because, you know, they commit capital for a long time. What they would like to get is some assurances, some stability, and then—they know how to run a successful business if you just give them the rules.

Ms. CASTOR. Right. Sometimes there is a disconnect between what happens here on Capitol Hill and what is really happening out in the business world and locally, too. But I want to compliment you for what you have proposed to do in the upcoming budget. On Mission Innovation, you have launched this—after the landmark global agreement in Paris, you proposed double funding for Government-wide clean energy R&D over the next 5 years. Your agency is set to be the leader in this effort. And I look forward to working with you to make this a reality. I was pleased to see robust funding for this initiative in the budget request.

Talk to us a little bit more about what you envision for Mission Innovation and how this is going to benefit all facets of our energy economy.

Mr. MONIZ. Well, maybe the best thing is just to use an example of the kind of thing that we have in mind here. And I will use ARPA-E—and by the way, for all the members, the ARPA-E summit is going on as we speak out at the Gaylord Nelson Convention Center. And I invite all of you to go out there and see really neat technologies. But we just announced the new performance results of ARPA-E. And of the first roughly 200 projects that were funded, roughly a quarter have received \$1.25 billion of private sector funding. Another quarter has received follow-on Government funding and not only from DOE but DOD. Thirty-six companies have been formed. There are 9 or 10 products out there already in the marketplace in a program that has only been operating essentially 5 years.

The last round of proposals, the so-called open call in 2015, was very successful in terms of the projects funded. The trouble was it was just barely over 2 percent of the applicants. We are leaving a lot of innovation on the table. And so with the formation of these clean markets—and again, look, one can argue for or against, however you wish, the Paris agreement. But the fact is essentially every country in the world committed to going towards lower carbon. And that means the already growing clean energy marketplace is only going to take off even faster. And we should stay at the head of the train and continue our innovation tradition and capture the benefits of it domestically and globally.

Ms. CASTOR. I agree. Thank you.

Mr. WHITFIELD [presiding]. The gentlelady's time has expired.

At this time, the Chair recognizes the gentleman from Illinois, Mr. Kinzinger, for 5 minutes.

Mr. KINZINGER. Thank you, Mr. Chairman.

And, Mr. Secretary, thank you for your service to your country and for being here. I appreciate it.

I just want to kind of briefly talk about something, and then I want to get into LNG a little bit more. Included in the budget are

plans to finalize DOE's multiyear program plan for grid modernization, which will create an integrated R&D program that will help ensure the future grid will deliver reliable, affordable, secure, resilient, and clean electricity to consumers. What specific kind of projects will be undertaken in this program do you foresee?

Mr. MONIZ. Well, I should note that a major piece of it—not all of it—but a major piece of it is also a lab consortium that came together to outline a program. There will be technology component R&D. We have a lot of stuff still to do. We have very large-scale power electronics, for example, managing grid flows in a new, smarter way. There will be the integration of information technology, particularly on distribution systems, including going behind the meter. But another kind of effort will be a real focus on doing, partly through large-scale modeling and simulation, system designs and trying to find the ways of working with that such that it helps also the ISOs, the State regulators, et cetera, in terms of building that new grid. I might add, if I may, that resilience is also critical. And some of the utilities are already making tremendous progress.

Mr. KINZINGER. And then, just very briefly, what is kind of your timing to launch and finalize? And then what opportunities for State and local municipalities will there be in participating? And are there going to be funding opportunities that you foresee?

Mr. MONIZ. Well, it is already going. So fiscal year 2016, we have launched it. We have asked for a significant increase in fiscal year 2017. As I say, we want to, especially on the systems side—I mean, as far as the technology goes, those will be competitive—

Mr. KINZINGER. And then what about like local municipalities and States to participate?

Mr. MONIZ. So I think, right now, our focus has been more at the State level and things like the ISOs who manage, obviously, the system. But if there are good ideas as to how we can effectively bring in localities, that would be great. Frankly, the urban challenge is so great for the economy, for the environment, and the integration with things like electric vehicles.

Mr. KINZINGER. All right. Thank you.

I am going to switch subjects. LNG exports and crude oil exports put the U.S. well aligned to help the energy security of our allies in Europe and Asia. What steps are being taken to increase global access to reliable and affordable energy from us? And then also maybe when you are looking into Europe, for instance, and, frankly, that Russia has a grip on Eastern Europe and Europe, what are we doing to kind of help Europe develop their own energy as well as our exports?

Mr. MONIZ. A lot of questions there.

Mr. KINZINGER. Yes.

Mr. MONIZ. First of all, in terms of LNG exports, as you well know, last Wednesday, a week ago today, the first ship left the United States. Kind of a major milestone in our gas revolution.

Mr. KINZINGER. Great.

Mr. MONIZ. So, right now, there are several other facilities being built. We have licensed for non-free-trade-agreement countries now 10.8 BCF per day. And we just finished the public comment period on the economic analysis of going up to 20 BCF per day. So we are now analyzing those comments. So that is going forward.



On the oil side, well, OK, oil exports are now going. And I have been consistently saying that at least for the foreseeable future this would have a relatively small impact. I see nothing so far to change that. It is a question of market structures and market prices.

As far as Europe goes, if I might say, and we would be happy to come by and talk about this more, already going back to May of 2014, we worked in the G-7 context plus the EU to establish kind of a template of what are the new energy security principles of the 21st century? We are working with them. The European Commission put out an energy security plan that very much follows that set of principles. So we continue that. There is in the FAST Act a requirement that DOE, working with State, come back to the Congress with an energy security report. We are working on that. And, specifically, we continue our work with Ukraine in terms of helping them with their integrated energy planning.

Mr. KINZINGER. Thank you. I only have 20 seconds, so I won't ask my next question, but I will just make the statement that it is very appreciated. You know, I see our energy as a very important part of our national defense structure, of our soft power, which prevents the use of hard power in many cases, and a very important part of posturing against the Russians and strengthening our NATO allies. So to the extent that you can continue to partner with that in development in terms of utilizing our blessed resources that we have would be very appreciated. So I appreciate you being here again, and thanks for your service.

And I will yield back.

Mr. MONIZ. Thank you.

Mr. WHITFIELD. The gentleman yields back.

And sorry my phone was so loud.

At this time, I would like to recognize the gentlelady from California, Mrs. Capps, for 5 minutes.

Mrs. CAPPS. Thank you, Mr. Chairman.

And thank you, Mr. Secretary, for your testimony and your presence here.

As you well know, climate change is real. The effects are real, and the time to act is now. Communities across the country and around the world are already facing the consequences. And it is going to take great leadership and political will to do what is necessary to act decisively to change this troubling trajectory.

This past December, almost all the world's countries came together to forge a path forward to respond to this fact. At the heart of this need is the requirement that we recognize the dangers associated with a business-as-usual approach to our energy landscape and embrace and implement the renewable energy technologies as quickly and broadly as possible. I was glad you spoke to this in your opening remarks.

This need is twofold. First, we need to rapidly expand on the implementation of existing green technologies, such as solar power, increased energy efficiency, but we also need to invest in developing new technologies that will help us transition to renewable energy sources. This is important, of course, for the environment, but also it really is a boost to our economy with the good-paying jobs that it can create.

But in order to lead in green tech innovation, we must actively support our researchers, scientists, startups, and investors. For example, the universities in my district have been integrally involved in research into developing green technologies. And you mentioned the Energy Frontier Research Centers designed by DOE in 2009. And UC Santa Barbara in my district was one of the first to apply and receive this boost. Since then, the center has made significant advances in key energy technologies, like photovoltaics and LEDs. Similarly, Cal Poly in San Luis Obispo has recently been awarded a DOE grant to conduct research into energy-generating offshore wave technology as part of the CalWave project.

So, Secretary Moniz, Mission Innovation, you have described it as a landmark commitment to dramatically accelerate public and private global clean energy innovation. Will you just give an example or two of how—I know you have already done so, but expand on that a bit—how this will help develop technologies required to move us toward a greener future? Specifically, I think how we can incentivize. To me, it is so much about our universities and research institutions.

Mr. MONIZ. Thank you. And maybe I will start by apologizing that yesterday we stole from your district Mike Witherell to become the director of the Berkeley Laboratories.

Mrs. CAPPS. I know you did.

Mr. MONIZ. Mission Innovation, again, obviously, it is going to be a very broad approach to energy technologies. But some of the high points, I think—well, for one, I have to say that I think the regional innovation partnerships are really important. They will lead to portfolio diversification and I think help build innovation ecosystems more broadly in the country.

If you go to specific areas, one of the focal points is certainly on the EFRCs, we want to expand that program. It has been a great success. The ARPA-E, here I would note: I mentioned early on in the discussion that the budget has a fairly modest discretionary increase, 2 percent, although with a priority attached to Mission Innovation, but also some mandatory requests. I say that now if we turn to ARPA-E, the request for ARPA-E is for a 20-percent increase in discretionary funding to \$350 million. I think the track record, I said earlier, more than justifies that. But it also suggests \$150 million of mandatory so that ARPA-E could also take on some different dimensions. In terms of some projects, for example, one of the advantages of mandatory funding is that it can give more certainty about a long-term commitment. And that is something that could be taken in this case. There could be scale up to more systems integration of different technologies. So I think we have thought this through in ways that are complementary. But then, of course, I mean, the specific technologies, frankly, across the board, we will look to get more innovation. Again, as I said earlier, there is a lot of innovation that we are leaving on the table.

Mrs. CAPPS. Thank you.

My second question, Mr. Chairman, was going to be to ask you to elaborate even more on ARPA-E, but you have already done so. If you want to submit anything more for the record. I am so taken by the significance of ARPA-E to our national security. The more we become energy independent as a Nation, the better it is for the

world and, certainly, for our place in the world. But thank you again.

Mr. MONIZ. In fact, if I may just add—I am sorry, Mr. Chairman, but just add, if you go out to the Gaylord Nelson Center and see these technologies—I was there yesterday—and you see everything from novel renewables to an incredible small compact methane detector that can be used in hydrocarbon production and other settings. It is really great stuff.

Mrs. CAPPS. Thank you.

Mr. WHITFIELD. The gentlelady's time has expired.

Mrs. CAPPS. Maybe he is suggesting a field trip for the committee.

Mr. WHITFIELD. Mrs. Capps, you lead that field trip, and maybe we can get it going out there.

Mr. MONIZ. After lunch.

Mrs. CAPPS. Thank you, Mr. Chairman.

Mr. WHITFIELD. At this time, I recognize the gentleman from Virginia, Mr. Griffith, for 5 minutes.

Mr. GRIFFITH. Thank you very much.

Let me start, Mr. Secretary, in saying you were here a previous time and indicated, after hearing a number of us from coal country talk about the problems that we were having, that your team was willing to work with us. They sat down with us. They even come to my district. Very much appreciate it. And we have a symposium that we are working on to have some of your folks come in and talk to the people who are in the industry in the district to figure out where we go in the future. So I greatly appreciate that. I appreciate you have already commented on my favorite, chemical looping, and other technologies that are out there.

In regard to the R&D, the Mission Innovation initiative that was launched by the administration in November to try to accomplish global clean energy innovation is working with a number of countries, China, South Korea, India, Indonesia, and Germany, who also recognize that coal is an important part of their electric generation into the future, and they share our northern hemisphere air with us. And I am just wondering what we can do because they are looking at coal long term. How do you intend to work within the initiative to develop cleaner coal technologies domestically so that then we can support international efforts to do the same? Be brief, because I got lots of questions.

Mr. MONIZ. First of all, Congressman, I want to thank you for hosting our people to go to your district and following through on that. That is the way we like to work with the Members whenever possible.

Mr. GRIFFITH. Thank you. You are one of the few who has followed through when they have said something in the committee about helping or at least looking at the problem.

Mr. MONIZ. We try.

Mr. GRIFFITH. Look, I recognize that and commend you for it and appreciate it.

Mr. MONIZ. Thank you.

In terms of developing the coal technologies, again, I do want to emphasize something that we have said before, that in the budget there are many, many different ways—it is not just the fossil en-

ergy R&D program. But in the fossil energy R&D program, we have, I think, basically streamlined in terms of the very large CCUS demos and now, in 2017, focused on developing these more advanced technologies, which could be big breakthroughs. So that is number one.

But we have things in science. We have things in ARPA-E. And we have things, like incentives, like the \$5 billion tax incentive that is being proposed for carbon capture and sequestration.

Mr. GRIFFITH. I do appreciate that, and I will come back to that in a minute.

I am also concerned, Gina McCarthy, the Administrator of the EPA, has said that she is still going to move forward with expending taxpayer resources, despite the Supreme Court's recent ruling staying implementation of the Clean Power Plan. Is DOE following the letter and spirit of the stay request and stopping any coordination on the State level when it comes to compliance with the Clean Power Plan?

Mr. MONIZ. Well, again, of course, again, as we said earlier, the Supreme Court action was a stay; it was not a judgment. We have ongoing work with States. It is longstanding. We give grants to States, the State energy offices. We do technical assistance to State energy offices. We established a program with labor unions to provide them technical assistance in terms of how State implementation plans could maximize job creation, something that, again, could be of interest to you. So we continue those kinds of activities.

Mr. GRIFFITH. I appreciate that. Can you tell me how many carbon capture and storage commercial-scale power projects are up and running today?

Mr. MONIZ. Up and running? Well, there is Boundary Dam in Canada. There are a variety of industrial facilities that have CCUS here and globally. There is one operating in the United States; one about to operate; and Petra Nova in probably less than a year, as a coal powerplant in Texas with enhanced oil recovery.

Mr. GRIFFITH. All right. Because talking about Boundary Dam, my understanding is that the project—

Mr. MONIZ. I should have said Kemper is coming as well.

Mr. GRIFFITH. OK. But my understanding is Boundary Dam is currently the only operating post-combustion capture system in the world. And the EPA relied on that to make its determination that CCS is adequately demonstrated for commercial power production. But I am reading all these articles that say they are only hitting about 40 percent of where they thought they would be. I am just wondering if you can say, is that accurate to your understanding? Are they doing better than hitting about 40 percent of what they projected?

Mr. MONIZ. I think, frankly, it is not different from many other of these technologies where we are pushing forward where it takes engineering know-how. I mean, forget carbon capture—when the first integrated gasification coal plant started operating in Florida, for example, and the same experience was in other—in Spain and elsewhere, that IGCC plant, it took 3 years to reach its operating because you are learning, you are breaking it in. And so I think this is nothing unusual.

Mr. GRIFFITH. I think—

Mr. MONIZ. The same is true, by the way, for CSP plants.

Mr. GRIFFITH. I would just say that, while you would expect some, 40 percent seems awfully low. And I think it may take them a little bit longer than 3 years.

Mr. MONIZ. I could come and show you the IGCC histories, no carbon capture, just IGCC, and you will see maybe it is on track.

Mr. WHITFIELD. The gentleman's time has expired.

At this time, the Chair recognizes the gentleman from Maryland, Mr. Sarbanes, for 5 minutes.

Mr. SARBANES. Thank you, Mr. Chairman.

Mr. Secretary, I can't tell you how much confidence you give me in the Department of Energy's role in the environment portfolio, all of these innovations. And I think your positive impact in so many ways around the country is probably unrivaled in terms of someone serving in your capacity. So I want to thank you for that. I just get excited listening to all the things that you are working on and proposing, because I do think it puts—

Mr. MONIZ. It is a great department.

Mr. SARBANES. You are on the cutting edge. I think you are having a field day. So I did want to talk about I noticed in the budget that you proposed consolidating the Department's efforts in a new Office of Energy Jobs Development. I wanted to speak about that for a moment. And that office is going to do a number of things: manage the collection of energy jobs data, which is critical, and then issue an annual report on our progress there; coordinate the ongoing energy workforce development activities across the Department and in this amazing network of National Labs that you alluded to; and, thirdly, provide technical advice and support to States and localities to advance energy workforce training and economic development.

And we have already seen examples of that in Baltimore. And I want to support the DOE's investment in these sorts of activities. In particular, the clean energy sector has tremendous potential, as you know, to be the next big growth industry that can spur the economy. We have an amazing partnership that has come together in Baltimore recently that has begun to be developed between the Department of Energy, that is providing its expertise and technical assistance, the City of Baltimore, the Maryland Clean Energy Center, and a variety of nonprofits to create a sustainable low-income solar installation workforce training initiative, which would accelerate home weatherization, the deployment of solar energy, with a focus on low-income housing in the City of Baltimore, train underemployed or unemployed community members to step up into these job opportunities as part of an energy industry workforce, and then secure full-time employment for trainees within the growing energy industry in Maryland. In that sense, this project or initiative really models the kinds of things that you are already doing across the country and can increase efforts around the country in a like manner.

So can you just give me some of your thoughts? Because, obviously, the Department views this as a priority and just a basic economic development initiative, particularly one that can focus on some hard-hit and neglected economic areas around the country. It offers great promise.

Mr. MONIZ. Well, thank you, Congressman. And also thank you for your personal engagement in the Baltimore solar initiative. Also, Congressman Cummings and Senator Cardin, as well. But you have been particularly deeply engaged, which we appreciate. So the Baltimore initiative was, I think, as you say, a good model. We are working with the local institutions, Morgan State University being just one of them. And the idea is here, for the members, is to try to integrate solar deployment with the weatherization of homes for higher efficiency in low-income areas. And, obviously, Baltimore has had its challenges over the last year.

So I would like to use that to go to your opening statement about establishing the Energy Jobs Development Office. About 2 years ago, we brought in I think two outstanding individuals. And they were prime movers for the Baltimore thing. But they have done a terrific job on jobs broadly. You mentioned data. It is very hard to get data on what energy jobs are. So we have been working with the Department of Labor to do this, as you say, in an annual report. And that is a foundation for understanding not only what is happening, but what can we do to make it better? So that is just one example. So I do ask the Congress to allow us to have a separate budget line, rather than passing a tin cup around, to have this jobs focus. I just mention, the last thing I will say is, again, you have raised it, is in this case of the solar, it would be great to link that then to training local citizens to do things like solar installation. In November, this country passed 208,000 direct jobs in solar alone. And on the installation side, you are certainly talking north of \$20 an hour for an installer. Get some training. We will do a community college program to do that. I think this is what we have to do in more urban areas.

Mr. SARBANES. Thanks very much. We look forward to working with you.

Mr. WHITFIELD. The gentleman yields back.

At this time, the Chair recognizes the gentleman from Ohio, Mr. Johnson, for 5 minutes.

Mr. JOHNSON. Thank you, Mr. Chairman.

And, Mr. Secretary, it is good to see you again. Before I get into my questions, I would like to engage in a topic that you and I have had a conversation about many times before. And I would be remiss if I didn't highlight my disappointment with your Department's recent decision to withdraw support for the American Centrifuge Project down in Piketon, Ohio. I think this is a very seriously flawed decision. I believe that by allowing the ACP to shutter operations, we are essentially seriously further hindering our ability to readily provide domestically enriched uranium for national security purposes.

And one of my biggest concerns is the contradictory nature of the decision in light of the very report that your Department produced upon which the decision was made, because one of the viable options in that report that was discounted was discounted because of the loss of the workforce from a previous facility. And I worry about how this loss of this uniquely skilled workforce is going to play out over time, and how that could be detrimental when DOE eventually decides, once again, that we need to build out our domestic uranium enrichment capability. That workforce is not going

to sit there and wait. Those people have got to find jobs somewhere, and they are not going to be sitting idly by.

So I just wanted to reiterate one more time, Mr. Secretary, that I believe that is a very flawed decision. And I hope you will take that under consideration. And if there is any way to reverse it, you certainly have my support, and I believe many of my colleagues as well.

Mr. MONIZ. Should I comment?

Mr. JOHNSON. Certainly.

Mr. MONIZ. I won't go through the entire decision process, but just to note that, first of all, the program continues. Unfortunately, for the Portsmouth side—and it is not nice, I am not happy about it—but the spinning of the existing old centrifuges has stopped. But key skills will be sustained. But the real issue is that we do need—I have been totally consistent and agree with you—at some point for sure we need a national security enrichment train. And, right now, the ACP is the only candidate at the moment for sure. And the Portsmouth facility remains uniquely suited and designed to house that national security train. The thing is it costs billions of dollars, which have not been made available at the moment. And with the long—

Mr. JOHNSON. If I could interrupt you, Mr. Secretary, they have been made available, because Congress continues to fund that project. How can you say they are not available?

Mr. MONIZ. Billions of dollars to build a new national security train. That is the issue.

Mr. JOHNSON. Well, I don't think I grasp that.

Mr. MONIZ. I would be happy to get together with you and do it again.

Mr. JOHNSON. We will take that offline, because that is a new one that I am not familiar with. Because the cascade is there now. And the cost to change that cascade to an operational one seems to me would be a lot cheaper than starting from scratch.

Mr. MONIZ. No, but the problem is that—well, again, we should maybe go offline. But that cascade will not be part of a national security train. We can discuss that.

Mr. JOHNSON. OK. Let's talk about it. Now, another USEC-related question, you said that Congress gave DOE authority in 2000 to use the USEC funds, which is the American Centrifuge Project, for the D&D cleanup. But from 2000 through 2015 or 2016, that was never proposed. Why now would the budget propose using the D&D—or the USEC funds to fund the D&D? Just a clarification.

Mr. MONIZ. There were proposals in 2000 to use the USEC fund. They, in the end, were not approved to use the fund. And in the intervening period, of course, the utilities then stopped paying into the UE D&D fund. Congress has essentially chosen to appropriate out of discretionary funds. We are suggesting that it is time, when we have \$5 billion in three funds, we think it is time to go back and to think about what might be, frankly, also a kind of a stable way potentially of addressing this. One of the differences to when the utility payments were ceased upon agreement was that the full cost of the D&D was not known. Now we see about a \$22 billion to go on UE D&D. So it is a big number. And there is about \$5 billion in those three uranium funds today in the Treasury. And by

the way, one of the ironies, we would say, is that interest is charged. So they sit in the Treasury. Interest is charged. The amounts keep growing. We are just proposing maybe it is time to start using those.

Mr. JOHNSON. OK. We will talk offline. Thank you.

Mr. WHITFIELD. The gentleman's time has expired.

At this time, the Chair recognizes the gentleman from Pennsylvania, Mr. Doyle, for 5 minutes.

Mr. DOYLE. Thank you, Mr. Chairman.

And I want to thank my two colleagues for their courtesy in letting me speak today.

Secretary Moniz, thank you for being here. It is always a pleasure to have you here in front of our committee. And I want you to know how much I appreciated your visit last year to Pittsburgh. And you didn't get a chance to tour the NETL, so I want to invite you to come back as soon as possible so that you and I can visit the NETL in Pittsburgh and the incredible workforce that is down there.

Let me ask you a question. This is the first DOE budget to distinguish or delineate between the NETL's infrastructure program versus the research and operations program. Can you explain this distinction in a little greater detail and the reason why you have decided to structure the budget this way?

Mr. MONIZ. Well, one of the principal reasons is that the outstanding relatively new director of NETL urged us to do it this way. And I think she is right. Previously, the budget was kind of—it was hard to figure out what it was. A piece of it was in the CCS line. A piece of it was in program administration. And now I think this gives greater transparency because, of course, as you well know, NETL has got two very different functions: one is the R&D, and one largely is kind of a contract manager, not only for FE but for other programs as well. This gives kind of identity to the research program. And we remain very interested in strengthening it. In fact, there is an increase this year particularly to, finally, I think, address the supercomputer needs at NETL.

Mr. DOYLE. So, as far as the impacts on the workforce and the organizational structure at NETL, you are saying this just helps distinguish funding lines for program management versus R&D?

Mr. MONIZ. Yes. Correct. And, in fact, there has been an increase in the R&D.

Mr. DOYLE. I certainly support increased funding for the NETL that is featured in the budget. But I am a little concerned that the request seems to represent an overall decrease in funding for fossil energy R&D and so, specifically, a significant decrease in funding for CCS and advanced power systems at NETL. Can you explain a little bit the reasoning for this decrease?

Mr. MONIZ. See, part of that is the—we can call it restructuring, but it is the, frankly, the termination of some of the large demonstration projects that could not reach financial close. And so those funds have been redirected to supporting now what I would call more R&D as opposed to the demonstration projects. So that is where the pilot projects, for example, for chemical looping, which NETL is actually working on right now—they have a smallish facil-



ity—and oxycombustion and the like, so I think this actually strengthens what I would call more of the basic R&D program.

Mr. DOYLE. So, also, in the budget, you are basically adding natural gas carbon capture under the carbon capture heading that was previously reserved for coal-related research.

Mr. MONIZ. Right.

Mr. DOYLE. Could you just expand a little bit on your thought process for that?

Mr. MONIZ. Well, so that is a relatively small amount of funding—I forget the exact number, maybe \$15-million-something—to go into the design of what could then be a natural gas carbon capture demonstration of some undetermined scale at the moment.

Because the reasoning is quite simple. Clearly, carbon capture with coal, whether it is direct as we are now doing or some of the new approaches, is important. But, also, with natural gas. We have a long view in terms of our technology development. And, right now, gas, one can argue, has been contributing to lower carbon emissions, but if we are going to practically decarbonize the electricity sector, ultimately natural gas would have to have carbon capture as well.

So this is the early stages of design.

Mr. DOYLE. Yes.

And, finally, I was pleased to see the administration's initiative to increase investment and research dollars in clean transportation systems. Can you explain how, under the 21st Century Clean Transportation Plan, stakeholders like our universities or companies in the area can work with the administration?

Mr. MONIZ. Oh, I think there would be substantial calls for proposals to do that. The proposal in that plan is for \$500 million additional in transportation. So it would be very, very broad-based. And that is quite separate from the infrastructure, the fuels infrastructure issues. It is really R&D on those areas. So, certainly, if I am issuing that, there will be plenty of chances for the universities to—

Mr. DOYLE. Great. Thank you. And let's get a date to go down to NETL in Pittsburgh.

Mr. MONIZ. You got it.

Mr. DOYLE. Thank you.

Mr. Chairman, thank you very much.

Mr. WHITFIELD. Thank you.

The gentleman yields back.

At this time, I recognize the gentleman from Missouri, Mr. Long, for 5 minutes.

Mr. LONG. Thank you, Mr. Chairman.

And thank you, Secretary Moniz. It is always a pleasure to see you here and hear from you. You kind of brighten my day when you come in and talk to us, so thank you.

One of the—

Mr. MONIZ. Uh-uh.

Mr. LONG [continuing]. New projects announced at the Paris climate conference is the Mission Innovation program. Now, I am taking my family down to Disney World later this month, and if I saw a ride there, Mission Innovation, it would not surprise me because that sounds like something you would ride at Disney World. But

this involves the U.S. and 19 other countries. A key component of the program is the Breakthrough Energy Coalition, which is a group of international private capital investors.

Could you expand on how this investment coalition is comprised and what the level of involvement is or cooperation between the Department of Energy and this breakthrough group?

Mr. MONIZ. Certainly. The 2 initiatives or coalitions, if you like, the 20 countries and the 28 investors from 10 countries, they are independent. Now, there is communication. So they were formed in parallel, and the idea was, because they have the opportunity to feed off of each other, we increased the innovation pipeline, that gives more investment opportunities, and these investors declare, "Well, yes, if you guys give us more opportunities, we are going to be there with billions of dollars to come and invest."

But I want to emphasize that, whatever information is generated, for example, it is possible that—we have talked about but have not yet nailed down—around June, early June, we should have this kind of more nailed down, the relationship. We may do some joint technology roadmaps, like what is the pathway to sunlight to fuels as a kind of a possible transformative thing.

But if done—after all, we are a Government agency—such information would not be proprietary to those investors. That would be open to everybody to see the benefits of.

Mr. LONG. That was part of my next question, is do you have any concerns that these private investors are gaining an advantage or an upper hand through special treatment from the Department of Energy's clean energy program.

Mr. MONIZ. Oh, well, that is what I just addressed. No. So we have to make it sure that it is great but they don't have special access to information or to lab technologies, et cetera. We have to make this transparent. And we have done this, by the way—

Mr. LONG. So at what point is this available to the public, I mean, these findings or whatever you want to call it?

Mr. MONIZ. Whenever they are done. I mean, like, if it is a technology roadmap, when we have it—

Mr. LONG. So they are going to be private investors working with the Department of Energy to come up—

Mr. MONIZ. It could be, and with some others, talking about—so the idea is—

Mr. LONG. So you wouldn't feel that it would give them an advantage?

Mr. MONIZ. Well, the information would then have to be available to everyone as a public DOE report. And, no, so we are very sensitive to that, that—

Mr. LONG. So that is a no, I take it. You don't think that it would give them an advantage.

I am just thinking that if they are involved from day one and the way things develop—

Mr. MONIZ. The only advantage would be—but it would not be exclusive to them—would be to have thought about this particular technology area. But others are thinking about it. In fact, the one I mentioned, we already have a hub doing it, with all the results published.

Mr. LONG. OK.

Mr. MONIZ. Yes.

Mr. LONG. You mention in your testimony that the budget request takes steps to implement recommendations from the first installment of the 2015 Quadrennial Energy Review.

Which recommendations are you referring to in your report there? And what is the timeframe for implementing the recommendations from the QER?

Mr. MONIZ. For that, I should probably find my notes, because it is quite a long list in the FAST Act.

There are issues of our being charged to do an energy security plan, for example, with State. There are issues about doing a study to bring to the Congress on the establishment of an electric power transformer reserve, for example. There is a really long list of issues, and we are working on all of them.

Mr. LONG. OK. Could you maybe summarize that or get me, like, bullet—

Mr. MONIZ. Sure.

Mr. LONG [continuing]. Points or something to give that to my staff? Because I do have—

Mr. MONIZ. If I can find it in my papers, I can give it to you now, actually.

Mr. LONG. OK.

Mr. MONIZ. OK. Anyway, we will certainly get that to you.

Mr. LONG. We have 8 seconds till liftoff, so we had better—if you can get it to me later, I would appreciate it.

And, like I said, it is a pleasure to have you in here. Thank you for being here.

And I yield back, Mr. Chairman.

Mr. WHITFIELD. The gentleman yields back his 1 second.

At this time, I recognize the gentleman from Kentucky, Mr. Yarmuth, for 5 minutes.

Mr. YARMUTH. Thank you, Mr. Chairman.

Mr. Secretary, nice to see you here. Thank you for your responses and your presentation.

I want to congratulate the committee chair, my colleague from Kentucky, Mr. Whitfield, for holding this hearing and for allowing you to present the concepts and the priorities of the Department of Energy.

And I cannot resist taking the opportunity to say that, as a member of the Budget Committee, I was astonished that the chairman of the Budget Committee, for the first time in 40 years, did not allow the Director of the Office of Management and Budget to come to the Hill and present the administration's overall budget.

And I think the usefulness of a hearing like this, in which we really do get into the plans and priorities of the Department, is something that could benefit the American people and the Congress, as well, if we were able to discuss the President's overall budget. So I wish that Chairman Price of the Budget Committee would reconsider that and allow such a presentation. And I will tell him how much I appreciated this hearing.

One of the things that I think about a lot, Mr. Secretary, is that, at its optimum efficiency, Congress moves at 10 miles an hour, and we have a world that is moving at 100 miles an hour, and how are

we able to make long-term policy that actually makes sense when things are changing so rapidly?

And I think about, for instance, driverless cars and the work that Government is going to have to do very quickly to figure out how to accommodate that. So I can't imagine a field that this is more appropriate to discuss within than the energy field. And I know so many things have been happening and are happening.

So I guess a broad question is, can you think of areas in which Congress really needs to start thinking about policy for things that are about to happen that we are totally unprepared for?

Mr. MONIZ. It is always hard to predict what you are unprepared for, but I certainly agree with you. Your clock speed statement is very apt, and the driverless cars are a terrific example. I think 2 years ago very few would have seen this coming at us so fast. And it raises huge numbers of policy issues, obviously, with liabilities and all kinds of issues.

So I would just say there are two areas where I think—and they are actually in some sense linked—where I see enormous change happening, the kind of change that we didn't anticipate with the oil and gas revolution, say, 15 years ago.

One is that, if you look at the entire electricity system—and, by the way, the second installment of our Quadrennial Energy Review—the first one was on infrastructure across the board. This one is on the electricity system end-to-end. And there are so many moving parts—on the high-voltage grid, on the distribution system, the integration of IT, energy storage suddenly coming to maturity in terms of costs.

So there are the technology issues, but then how do we value the services; how do we value fuel diversity; how do we value storage in the system; how do we value when we have distributed generation and what it is doing not only in terms of supplying energy but in terms of, potentially, stability in the system, voltage stability, you know, you name it; how do we go, in this example, behind the meter into the consumer's place in terms of new services.

As we do that and as we get more and more successful, or continuing our success, in terms of decreasing energy intensity, energy efficiency, et cetera, business models of utilities have to change. It is not going to be the same system.

What does that mean for our regulatory system? I don't want to open Pandora's box. But, you know, we have a historical system built around States, and we have to work with it, but recognizing that it does not match the physical realities of the system as it emerges. So that is a big one to think through, that whole kind of system.

Another one is, I think—and it is not unconnected—is the urban environment and potential transformation there, I mean energy-linked. Your driverless cars, for example, can be a big piece of that, right? A whole different ownership model, a whole different—the model is different.

And, furthermore, if you speculate—and now I am going off into the wild blue yonder. But if you speculate about a city that has become practically all electric and quiet and clean, well, maybe you build your buildings in different ways.

So I think those are two big issues where there are so many threads to pull together.

Mr. YARMUTH. OK. I appreciate that answer very much. Thank you.

I yield back, Mr. Chairman.

Mr. WHITFIELD. At this time, the Chair recognizes the gentleman from Oklahoma, Mr. Mullin, for 5 minutes.

Mr. MULLIN. Thank you, Mr. Chairman.

And thank you for being here again. I know we have spoken on several different occasions.

And, you know, you come today asking for a significant increase at a time when we are still running deficits across the country. Can you just give me your number-one priority, what you would use the money for?

Mr. MONIZ. Well, the first point I would make is that, again, our discretionary request—

Mr. MULLIN. No. The number-one thing, what are you looking for, the number-one—

Mr. MONIZ. I want to make the point, it is 2 percent, and the President's budget is within the cap.

Now, in terms of this budget and the number-one issue in terms of new direction is the Mission Innovation direction writ large—

Mr. MULLIN. Is that across the board, or is that just with renewables?

Mr. MONIZ. It is across the board.

Mr. MULLIN. Because the policy in the past that your administration has put forth, and your agency, isn't across the board. It is not equally yoked. It seems to have a tendency to lean towards renewables.

And with that being said, I have another question for you. DOE is charged with setting effective and comprehensive national energy policy. Is that correct?

Mr. MONIZ. Sort of.

Mr. MULLIN. Sort of?

Mr. MONIZ. Well, only because—

Mr. MULLIN. I mean, I thought that was the reason why it was in existence to begin with.

Mr. MONIZ. No, no, no, the Energy Department, of course, has the major—

Mr. MULLIN. Well, it is not "sort of." It is either "yes" or "no."

Mr. MONIZ [continuing]. Makes energy technology development. But my point simply is, as was evident in the Quadrennial Energy Review, energy is—

Mr. MULLIN. No, I am talking—I don't care about the energy review. I am talking about DOE is charged with setting effective and comprehensive national energy policy. Is that a yes or a no?

Mr. MONIZ. Energy touches many equities—

Mr. MULLIN. It is just a simple "yes" or "no."

Mr. MONIZ. I am trying to answer the question.

Mr. MULLIN. I don't need an explanation. I just need a "yes" or "no."

Mr. MONIZ. Because the answer is, then if you take something like the Quadrennial Energy Review—

Mr. MULLIN. Just a "yes" or "no," sir.

Mr. MONIZ [continuing]. That is bringing together——

Mr. MULLIN. I am not asking for a long answer. I just want a “yes” or “no.”

Mr. MONIZ. I am giving you the shortest answer that is meaningful.

Mr. MULLIN. The shortest one would be “yes” or “no.” It is either a three-letter word or a two-letter word.

Mr. MONIZ. We play a central role in pulling——

Mr. MULLIN. Now, sir, I just want a simple “yes” or “no.”

Mr. MONIZ [continuing]. Together the energy threads for a coherent energy policy.

Mr. MULLIN. So is that a——

Mr. MONIZ. Yes.

Mr. MULLIN [continuing]. “Yes”? Why didn’t you just say that to begin with?

Mr. MONIZ. Because it needed a little bit of——

Mr. MULLIN. No, it didn’t need anything else. All I needed was a “yes” or “no.”

So is part of that about the affordable and reliability of our energy policy?

Mr. MONIZ. Say it again. I am sorry.

Mr. MULLIN. Is part of that policy about the affordable and the reliability to our taxpayers, to the American people?

Mr. MONIZ. Absolutely.

Mr. MULLIN. Then why are we allowing——

Mr. MONIZ. And security and environment.

Mr. MULLIN. Then why are we allowing the EPA to set agenda for DOE?

Mr. MONIZ. Those are environmental rules about air quality.

Mr. MULLIN. Clean Power Plan? Is that not going to affect affordable and reliability issues?

Mr. MONIZ. This goes back to the earlier answer, why it is more complicated than “yes” or “no.”

Mr. MULLIN. No, it is not. What we are doing is you are allowing agencies to——

Mr. MONIZ. Environmental policy has historically always affected energy policy, as has, often, security policy and——

Mr. MULLIN. We all want to be good stewards, but what I have an issue with is when the EPA becomes able to set policy for the DOE and when DOE becomes a source of agenda-driven issues rather than really focusing on making sure that we have reliable and effective, efficient energy sources to the American people. And when we start looking at only one factor, such as green renewables, which is an agenda-driven policy, and we take a look away from what has driven this economy and our energy resilience, I have an issue with that.

And we want the Department of Energy to be successful because we want America to be successful, but we don’t want it to be agenda-driven. And we are allowing the EPA step all over your agenda or your policies by setting policies through the Clean Power—and I don’t see any pushback from you or your agency saying, “Wait, this is part of ours too. You are affecting us.” Instead, you are just going along to get along.

That is from my perspective. Now, if you can tell me something different, please let me know.

Mr. MONIZ. OK. So the EPA is putting out a clean air regulation. Our job in the energy sector, as it is in any sector that influences air quality, is to develop the ways to respond to what the regulations, the laws of the land are.

Mr. MULLIN. What if it affects the reliability of it?

Mr. MONIZ. Sorry?

Mr. MULLIN. What if it affects the reliability?

I don't know who you keep looking to over there, but you and I are the ones talking here.

So what if it affects the reliability of it?

Mr. MONIZ. The reliability is clearly an issue. Some of our analyses—

Mr. MULLIN. Do you not see the Clean Power Plan being a reliability issue if it goes into full effect?

Mr. MONIZ. Well, for example, we did an analysis around the natural gas system, and we found that there were not reliability risks.

Mr. MULLIN. That is very hard to believe.

Mr. MONIZ. We can show you the analysis.

Mr. MULLIN. I appreciate it.

I yield back.

Mr. MONIZ. It is published.

Mr. WHITFIELD. At this time, the Chair recognizes the gentleman from Vermont, Mr. Welch, for 5 minutes.

Mr. WELCH. Thank you very much.

You know, taking up on Mr. Mullin's questions, there is required to be a change in the model if we are going to change our energy mix, if we are going to move to distributed generation. And those are extraordinary challenges that our utilities face.

But that is an agenda that we have in Vermont. You know, we have utilities that are all in on trying to promote distributed generation, that are promoting solar, that are really strong on efficiency. And it is a complete departure from the old model that used to exist in the Vermont utilities of just promoting more usage of energy.

And my question—one, I want to cite that. And, two, I notice in your budget there is a lot of emphasis on trying to facilitate activities such as distributed generation, renewable battery storage, and so on, and just give you a quick minute to comment on that.

Mr. MONIZ. I would say yes.

Mr. WELCH. All right.

You know, the second thing, Mr. McKinley was asking about coal country and inviting you to West Virginia. I want to thank you for coming to Vermont. It was a very meaningful visit. Go to West Virginia. I went there with Mr. McKinley. He took me into a coal mine. And I want to focus attention on the parts of your budget that are going to help coal country out. Because whatever one thinks about coal, those coal workers have kept the lights on in this country for generations.

And I want to just give you an opportunity to comment on the President's proposal with respect to money that can help the Appa-

lachian fund. And a billion dollars is being proposed to come from the abandoned mine fund to help out in coal country.

Mr. MONIZ. Right. So, again, without repeating it, I just again want to emphasize that there are a huge number of pieces that affect coal in our budget, not just the fossil energy R&D budget.

Among those, again, I will mention something that I think will be very important to put in are the tax credits that I mentioned earlier, but, very importantly, the Power Plus Plan, which is precisely the plan—it is administration-wide, it is not DOE, administration-wide, in terms of really helping communities in multiple ways, including what we can help with in terms of economic development but certainly retraining and other programs, of course weatherization, et cetera.

This is part of why we have two offices that are critical here. One is the ED office, the economic development and diversity office, and then this jobs focus, this Jobs Strategy Council I formed. They have been in coal country. Well, they have visited Mr. Griffith, for example, and I think it was a—I heard from them, as well, that it was a very good visit. And we are trying very hard—

Mr. WELCH. I would encourage you to keep doing that because that is the one area where—

Mr. MONIZ. Yes. Yes.

Mr. WELCH. And these coal workers are—

Mr. MONIZ. Yes.

Mr. WELCH [continuing]. Wonderful people, and they—

Mr. MONIZ. Yes.

Mr. WELCH [continuing]. Are getting hammered, and we have to help them.

Mr. MONIZ. We completely agree. And, again, I would urge that the Congress look favorably, I hope, on our trying to convert that into a separate budget line, a little office. Frankly—

Mr. WELCH. Well, I would be glad to work with you and colleagues on doing that.

Mr. MONIZ. And that goes back to what Mr. Rush said earlier.

Mr. WELCH. Yes.

Mr. MONIZ. Because I think, if we do that, we have a better chance of trying to kind of get that planted in the Department of Energy as a function that will go on in the next administration.

Mr. WELCH. Well, thank you.

I have 1 more minute. We have a plant, a nuclear plant, that is being decommissioned, and we are just stuck with the nuclear waste that is in dry-cask storage along the banks of the Connecticut River. It is really a problem. It is a problem for us. We are going to live with this for how long, we don't know.

Yucca Mountain, none of us are particularly optimistic about its prospects. We have a bill in Congress, a bipartisan bill, where Texas wants to have an interim storage site. Vermont would be glad to provide some stuff to store. The administration's blue ribbon commission seems to be open to that.

I know this is a difficult, delicate issue for you, but what about the prospects of having some interim storage site while whatever is going to happen with Yucca works itself out so that we don't have this waste literally right along the banks of the Connecticut River?



Mr. MONIZ. We have a request for information out right now to the public, following through on the consent-based approach to storage—pilot interim storage, big interim storage, and geological repositories for both civilian spent fuel and high-level waste.

We are moving forward, to the extent that we can, in getting the interim storage advanced. We cannot without congressional authorization actually do a site.

But the issue that has arisen with Texas about the possibility of a private site is one that we would support the Congress providing clarity on that as being an acceptable path forward because, ultimately, presumably, to work, that may at least require access to the Nuclear Waste Fund, and it would certainly require legislative action.

Mr. WELCH. Thank you very much, Secretary Moniz.

And my time is up, and I yield back. Thank you.

Mr. WHITFIELD. The gentleman's time has expired.

At this time, I recognize the gentleman from North Carolina, Mr. Hudson, for 5 minutes.

Mr. HUDSON. Thank you, Mr. Chairman.

And thank you, Mr. Secretary, for being here with us today.

The original Advanced Research Projects Agency within DOE has been in existence for a few years now. Part of the mission of the program is to, quote, "accelerate transformational energy technologies from concept to market," end quote.

Has anything come to market yet since the program's inception 6 years ago? For example, has there been any wide-scale deployment of commercialized product that has resulted from the ARPA-E program?

Mr. MONIZ. Yes, sir. And, you know, this is a pretty short time for this kind of business, and already there are 36 companies and, I don't know, 9 or 10 commercial products being sold. And they span quite a diversity of technologies.

Mr. HUDSON. Well, that is encouraging to hear.

What metrics does DOE use to evaluate the success of these projects?

Mr. MONIZ. Well, I would like to talk about intermediate metrics and then the ultimate metrics.

The ultimate metrics are that these technologies have indeed—that some number of them have indeed gone into the marketplace and have scaled some appreciable time. In the energy business, that is not a 5-year business.

But the intermediate metrics, I would say, are very positive. I mentioned already the 36 companies and 9 or 10 products, but, in addition, about a quarter of all of the projects that have been completed have attracted well over a billion dollars of private-sector funding. Another quarter of the projects, roughly, has attracted follow-on interest from the Department of Energy or other Government agencies, like DOD, for example.

So when you take a program that is, by its nature, kind of pushing on the edge of the technology and roughly half of them after a 3-year project have got follow-on, including company creation, that is pretty good. If anything, it makes you worry, are we taking enough risk?

Mr. HUDSON. Well, when an ARPA-E funded project isn't resulting in progress or benefits, are there any protocols in place for ending that project?

Mr. MONIZ. Oh, yes. ARPA-E is a very different, by creation, a different structure. And you have active program managers who are very much close to the project—which is also, by the way, also receiving advice on tech to market. But if they are not working, then they just end. In fact, it has been said that, you know, in this kind of business, what you like is quick failure and long success.

Mr. HUDSON. Switching gears a little bit, you mentioned the first Quadrennial Energy Review. Can you tell me how much that first review cost?

Mr. MONIZ. To be honest, I don't have a precise number, but I would say a few million dollars out of our Energy Policy and Systems Analysis Office. Some of the work was done analytically in house, and then some of it was, you know, specific studies contracted outside.

Mr. HUDSON. Well, if you could get back to me with maybe more—

Mr. MONIZ. OK, we will try to—I am not sure we have actually kept a budget number in that way, but we will make an attempt at it.

Mr. HUDSON. OK. I appreciate that.

But assuming the costs are generally what you are saying, would you say it has been valuable based on that cost?

Mr. MONIZ. Extremely. I think it has been a tremendous return. The action of this committee and this Congress in incorporating a tremendous number of the recommendations into legislation has been important. It has also being actively used in the current Senate legislation being developed right now. And, in addition, it has influenced significantly State energy offices. We have had many interactions.

So we think this has been a great success, I think, verifying the idea that doing a deep, analytically driven document can really provide an excellent basis for discussions with the Congress and others.

Mr. HUDSON. OK.

And you have said the second installment of QER will conduct a competence review of the Nation's electricity system. What was the agency's motivation for focusing solely on electricity for the second QER?

Mr. MONIZ. Well, the motivation was that, as we are looking to put together the pieces for ultimately bringing them all together, in the first QER, which looked at all the energy infrastructures, it kind of said, well, you know, the electricity infrastructure is kind of first among equals, because so many other infrastructures in energy, information technology and the like, depend upon electricity.

So we think this is actually a core system. As I said earlier also in a response, it is also a system that is perhaps ripe for—well, it is going through some change and there may be a lot more coming as technology and new services drive the electricity system.

Mr. HUDSON. Thank you.

Mr. Chairman, I see I am out of time. And I will submit written questions to follow up on, just sort of what the timeframe for participation and when we expect that QER draft to come forward.

Mr. MONIZ. And I might add, the NC State hub on wide bandgap semiconductors is part of the technology for this new grid.

Mr. HUDSON. Great.

Thank you, Mr. Chairman.

Mr. WHITFIELD. All right.

At this time, the Chair recognizes the gentleman from New York, Mr. Tonko, for 5 minutes.

Mr. TONKO. Thank you, Mr. Chair.

And, Secretary Moniz, welcome. You have had quite a busy year since our last budget meeting. And to your credit, I want to thank and congratulate you on all you have done, ranging from the Iran nuclear outcome to Paris and the climate agreement and certainly embracing innovation. Your expertise and your leadership have been critical for our Nation, if not our planet's, future security and sustainability. So an awesome thanks.

Mr. MONIZ. Thank you.

Mr. TONKO. Mr. Secretary, Mission Innovation is a critical aspect toward meeting the goals of COP21 agreement. There was consensus coming out of Paris that new technologies and energy innovation will be needed to enable the transition to a low-, if not zero-, carbon-emission future.

And, by the way, I have to tell you I did a visit to the ARPA-E Innovation Summit. Tremendous leadership there. Thank you for the foresight, for the vision, and for the structuring of such a summit.

Can you explain the United States and its financial commitment to the Mission Innovation initiative? And how much more investment would you believe is necessary to meet that 5-year goal?

Mr. MONIZ. Well, the commitment specifically, to choose the words carefully, was to seek to double the energy R&D over 5 years, because, obviously, we have to work with the Congress to reach that. But the request this year, as you know, is 21 percent in the discretionary funds, and that would be, obviously, a linear trajectory to doubling.

And, again, I would just say, it may be semi-anecdotal, but every piece of evidence I have says we could get a lot more innovation with that increased investment.

Mr. TONKO. I share, certainly, that belief. It is important.

DOE's proposed fiscal year 2017 investment makes up more than three-quarters of the Government's Mission Innovation commitment, but it will really be a partnership amongst numerous agencies, the private sector, and other nations.

Can you explain just how that investment will be broken down across multiple DOE offices and Federal agencies?

Mr. MONIZ. Well, I don't have the exact table for the Federal agencies right now, but the second-biggest amount is in the Department of Defense, where they actually have quite a bit of energy work going on, substantially less than DOE, obviously, but quite substantial. They have interest in and we partner with them already in things like advanced drop-in biofuels. So they would like

to reduce their oil dependence, but they can't replace the engine, so they have to go to drop-in biofuel. So that is still a big challenge.

They have lots of interest in things like microgrids for their stationary assets, for their facilities. And, of course, something that is not a major energy user on the scale of, you know, quads of energy but very important for our warfighters is the question of portable energy that the people on the front lines can use.

Mr. TONKO. Thank you.

And there are some 19 other countries that have also made R&D commitments. What are the benefits of working with international investors? And what is the cooperative, collaborative research concept that you are hoping for here?

Mr. MONIZ. First of all, it is important to note that, among the countries, the 20 countries, there is no obligation, you know, to work together on projects. Every country makes its sovereign choice about managing its expanded portfolio. So the main thing here is that it gets a lot more innovation going.

Now, I expect that there will be enhanced collaboration between countries that share a specific interest in a project. For example, with India, we have, you know, discussed in general terms that distributed generation may provide a great opportunity for much more collaboration with them on technology development. We both have distributed-generation needs; they are somewhat different. But that could be a logical one.

Another one where we are already ramping up but, say, in our discussion with the Saudis, quite different, the issue of what are we going to do about HFC replacements, especially for warm climates, not only different operating fluids, potentially, but new thermodynamic cycles that are more adventurous, if you like, in the technology.

So I think those will appear, but we have no obligation for enhanced international collaboration. We manage our portfolio. The investors are international. They will be looking for the best opportunities that come out of these innovation pipelines in any of the 20 countries. So the extent to which we push, we are also going to capture that investment.

Mr. TONKO. Thank you.

Mr. Secretary, I have used up my time. Let me again thank you for your leadership. It is awesome. And the benefits of your leadership are showing themselves through all of this.

So, with that, I thank you and yield back, Mr. Chair.

Mr. WHITFIELD. The gentleman yields back.

And now I will recognize myself for 5 minutes of questions since I waited until everyone else asked their questions first.

Well, Mr. Secretary, thank you again for being here today. We really appreciate it.

Reference was made to the nuclear waste problem. And I am not sure exactly how many nuclear power plants we have operating in the U.S. today. I think it is roughly 100 or—

Mr. MONIZ. Roughly 100.

Mr. WHITFIELD [continuing]. Ninety-nine.

Mr. MONIZ. Ninety-nine, yes, right. Uh-huh.

Mr. WHITFIELD. And this does not reflect on you, but, as a Nation, I think we have made some major blunders in the area of

dealing with nuclear waste. I know the Nuclear Waste Fund, nuclear power plants have been contributing to that for some time. We have spent roughly—you can correct me if I am wrong, but we have spent roughly \$12 billion or so on Yucca Mountain.

When the day came for the Government to take possession of this waste and start moving it to Yucca Mountain, Yucca Mountain was not ready to take it, not certified. And so the nuclear power plants filed the lawsuit against the Federal Government and obtained a judgment against the Federal Government. I don't remember the exact amount of that judgment. I was told it was roughly \$10 billion. But do you know the exact amount?

Mr. MONIZ. I don't know the exact up to now, but the projections have said it could reach \$20 billion eventually.

Mr. WHITFIELD. Yes, because it is ongoing, because they can't take—so roughly \$20 billion.

And now we are looking at maybe an interim site. And it is my understanding—and I think you confirmed this—that that interim site would never work unless Congress approves it. Is that your understanding?

Mr. MONIZ. Yes. According to the Nuclear Waste Policy Act, we cannot establish an interim site without—

Mr. WHITFIELD. Right. And so here we are kind of at a stalemate on that issue.

Mr. MONIZ. Yep.

Mr. WHITFIELD. And then that brings up three other funds. On the Nuclear Waste Fund, the nuclear power plants are not paying into that fund as a result—

Mr. MONIZ. Correct.

Mr. WHITFIELD [continuing]. Of the judgment.

Mr. MONIZ. That was suspended.

Mr. WHITFIELD. Yes.

And the Government is paying them every year, I guess, a certain amount of money to satisfy this judgment. I don't know how much, but whatever it is. OK.

So, on the other side, the D&D fund, the USEC fund, the uranium supply and enrichment fund activities. On the D&D fund, normally the money from the cleanup—Paducah, for example, comes from the D&D fund. And it is my understanding that the D&D fund is funded from the utility plants as a result of some legislation maybe that passed around 1992 or so and that that was suspended in 2007 roughly. So, since then, they have not paid into this fund.

And how much is the Department of Energy spending each year to assist these communities in cleanup, total? Do you know exactly?

Mr. MONIZ. No, but I would guess it is—for the three sites, it is probably on the order of \$500 million. But, obviously, we can add up the numbers.

Mr. WHITFIELD. Yes. I mean, I think Paducah is roughly \$270 million, \$280 million.

Mr. MONIZ. Yes. I may be a bit low.

Mr. WHITFIELD. OK.

Mr. MONIZ. And Portsmouth, of course, there is also the barter contribution—

Mr. WHITFIELD. Right.

Mr. MONIZ [continuing]. Of about \$150 million. If you don't count that, then we are probably around \$500 million, I would guess.

Mr. WHITFIELD. But, now, you all are proposing some mandatory funding and taking money out of the USEC fund which I guess has just been sitting there——

Mr. MONIZ. Accumulating interest.

Mr. WHITFIELD. Oh, is that interest staying in the fund?

Mr. MONIZ. I believe so. That is my understanding.

Mr. WHITFIELD. OK. And in order to go to the mandatory funding, the way you all are suggesting, that would require legislation, as well. Is that correct?

Mr. MONIZ. Yes, we would need some authorization.

Mr. WHITFIELD. OK.

Mr. MONIZ. I believe. I believe that is the case.

Mr. WHITFIELD. All right.

Mr. MONIZ. I should check with the experts. But, also, there is also the question of offsets——

Mr. WHITFIELD. OK.

Mr. MONIZ [continuing]. Because of the budget cap.

Mr. WHITFIELD. Right. Right.

Now, OK, so—I wish we could talk a little bit more about that, but I only have, like, 20-some seconds left.

Mr. MONIZ. And I would just add, we did suggest a possible offset with the quarter-mil per kilowatt hour from the relevant utilities.

Mr. WHITFIELD. OK. OK.

Now, this is really a parochial issue. This gets down to Paducah. On September 2, you all issued a request for information for the Paducah cleanup project. And it is my understanding that the contract will expire—the current contract expires in July 2017. And do you have any idea if you all expect to renew a contract by that time? Or can you give me a brief explanation of where you think you are?

Mr. MONIZ. I would certainly expect that. But why don't I nail that down and get back to you promptly.

Mr. WHITFIELD. OK.

Mr. MONIZ. But, yes, our expectation is we are moving towards having a contract in place.

Mr. WHITFIELD. OK.

Mr. MONIZ. But we certainly need continuity, obviously.

Mr. WHITFIELD. Yes. Yes.

And then, in closing, I am going to editorialize for just a minute, just a pet peeve that I have, which does not relate to you. I hear so many people talk about we need to expand solar and wind to make us less dependent on foreign oil, which I have never exactly understood because wind and solar is about electricity and oil is about transportation.

Mr. MONIZ. I never said that.

Mr. WHITFIELD. You didn't say that, but so many people say that, and so that is my editorial.

So, having said that, I want to thank you very much for being with us. And we have been here almost 3 hours, so thank you for your patience. We look forward to working with you on the important agenda of the Department of Energy.

And we will keep the record open for 10 days. I think various members said they—some of them had additional questions and so forth.

And do we have anything for the record? OK.

Mr. Rush, do you have anything?

Mr. RUSH. No, nothing.

Mr. WHITFIELD. All right.

Then, Mr. Secretary, thank you so much.

And that concludes today's hearing.

[Whereupon, at 12:48 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]



**National Nuclear Security  
Administration  
Comments on the Final  
Report of the  
Congressional Advisory  
Panel on the Governance of  
the Nuclear Security  
Enterprise**

**Report to Congress  
May 2015**

**National Nuclear Security Administration  
United States Department of Energy  
Washington, DC 20585**



## **Administrator's Letter of Transmittal**

This report provides the National Nuclear Security Administration's (NNSA) response to the Report of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, as required by Section 3134 of the National Defense Authorization Act for Fiscal Year 2015. My comments, as Under Secretary for Nuclear Security and Administrator, NNSA, have been coordinated with the Secretary of Energy.

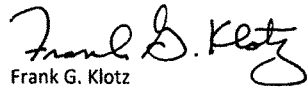
NNSA continues to make improvements in the leadership and management of its unique roles and responsibilities within the larger nuclear security enterprise; consequently we are pleased that much of the work that we have already undertaken and the changes that we are making are supported by the findings of this report. We know that we have additional work to do, and we are committed to making the NNSA a highly effective and continuously improving organization. This report highlights actions NNSA and the Department of Energy (DOE) have implemented or are currently underway, and addresses those recommendations of the Congressional Advisory Panel that we plan to pursue.

Pursuant to statutory requirements, this report is being provided to the following Members of Congress:

- **The Honorable John McCain**  
Chairman, Senate Committee on Armed Services
- **The Honorable Jack Reed**  
Ranking Member, Senate Committee on Armed Services
- **The Honorable Mac Thornberry**  
Chairman, House Committee on Armed Services
- **The Honorable Adam Smith**  
Ranking Member, House Committee on Armed Services
- **The Honorable Thad Cochran**  
Chairman, Senate Committee on Appropriations
- **The Honorable Barbara A. Mikulski**  
Ranking Member, Senate Committee on Appropriations
- **The Honorable Harold Rogers**  
Chairman, House Committee on Appropriations
- **The Honorable Nita M. Lowey**  
Ranking Member, House Committee on Appropriation

If you have any questions or need additional information, please contact me or Mr. Clarence Bishop, Associate Administrator for External Affairs, at (202) 586-7332.

Sincerely,

A handwritten signature in black ink, appearing to read "Frank G. Klotz". The signature is fluid and cursive, with the first name "Frank" and last name "Klotz" being the most prominent parts.

Frank G. Klotz  
Under Secretary for Nuclear Security  
Administrator, NNSA

## Message from the Secretary

The programmatic success of the Department of Energy (DOE) and its National Nuclear Security Administration (NNSA) in sustaining the nuclear deterrent for over two decades without testing, in reducing the nuclear danger by securing or eliminating a very large amount of weapons-usable nuclear materials, in providing nuclear propulsion for a Navy with global reach, and in carrying out critical nuclear analysis and counterintelligence for the Administration at large must be preserved and extended. To do so requires addressing governance issues that could compromise continued success in the coming decades or elevate costs in doing so. The task of evaluating these issues, which have been present since the establishment of NNSA fifteen years ago, and of recommending solutions was given to the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, commonly referred to as the Augustine-Mies panel. The Augustine-Mies report to Congress provides a welcome perspective on the state of nuclear security governance and the key steps needed from the Administration and the Congress for improvement of governance for the long term.

The quality and collective experience of the Augustine-Mies panel members are to be applauded. They and their staff did a very thorough job of fact finding and objective analysis. In that vein, their conclusions and recommendations deserve the full attention and appropriate response from both the Administration/DOE/NNSA and from the Congress. This message represents the initial response from the Secretary of Energy and the NNSA Administrator/Under Secretary for Nuclear Security.

To help frame the response, I charged the Secretary of Energy Advisory Board (SEAB) to present their observations on the panel report. The SEAB letter report (at Attachment), led by the Honorable Brent Scowcroft as chair of the SEAB Nuclear Security Subcommittee, strongly endorses the key Augustine-Mies findings and recommendations, thereby lending even further support to the Augustine-Mies conclusions from distinguished contributors to our nation's security over a long time.

The overarching conclusions of the Augustine-Mies panel are the need to "strengthen national leadership focus, direction and follow-through" with respect to the nuclear mission and "to solidify Cabinet Secretary ownership of the mission." Let me state clearly that as Secretary, I place the highest priority on "ownership" of the nuclear security mission, and spend a significant portion of my time and energies advancing its key goals. Further, in building the DOE/NNSA leadership team that includes Deputy Secretary Sherwood-Randall, Administrator Klotz, and Principal Deputy Administrator Creedon, the President has clearly appointed a group well versed and deeply engaged in nuclear security science, technology, management and policy. In my time as Secretary, I have seen how mission ownership has materially impacted NNSA directions and resources in support of key mission responsibilities. The appointment of Secretary Carter at the Department of Defense has further strengthened the Administration's nuclear security team.

A major conclusion of the panel was that, after evaluating several governance models, “the solution is not to seek a higher degree of autonomy for NNSA, because that approach would only further isolate the enterprise from needed Cabinet Secretary leadership. Instead it is recommended that Congress place the responsibility and accountability for the mission squarely on the shoulders of a qualified Secretary, supported by a strong enterprise Director with unquestioned authority to execute nuclear enterprise missions consistent with the Secretary’s policy direction.” We emphatically concur and would add to this that rebuilding national leadership focus on nuclear security will also require strengthening regular communications between the Secretary and the relevant Congressional leaders on the various policy elements that make up the nuclear security mission. As part of this, we propose to carry out the SEAB recommendation for a regular semi-annual report and briefing to Congress on progress in carrying out Augustine-Mies recommendations and updates on both progress and challenges in executing the mission continuously over short, intermediate and long time frames. The Deputy Secretary and the NNSA Administrator will lead the group that monitors our progress. The group will seek input enterprise wide and also from those outside DOE, such as the members of the Augustine-Mies and SEAB panels.


The panel goes on to offer important findings and recommendations about management practices. The panel states that “A major overhaul will be needed to transform the organization into one with a mission-driven management culture,” with “strong program managers focused on mission deliverables” and “clear accountability.” The panel observes that “an arm’s length, customer-to-contractor and, occasionally, adversarial relationship” has become too common and that a rebuilding of the trust that is a critical element of an FFRDC relationship is needed. I believe the panel is correct in these findings. When I became Secretary, I committed to restoring a more strategic relationship with the laboratory directors (not just NNSA) and I believe that we have made progress in this direction. This has been helped with some new institutional structures but even more, in my opinion, by more open communications about how the Department should pursue its multiple missions. This has benefitted both the Department and the laboratories, which of course is the objective of the FFRDC relationship.

I believe that various specific approaches to management processes are beginning to pay dividends, some of which are indicated in the Administrator’s accompanying report. However, notwithstanding some progress, there is a long path to follow to reach the management goals laid out by the panel. The report included an apt Peter Drucker quote at the beginning of Chapter 3: “Culture eats strategy for breakfast.” Culture change is not easy, and we do need such a change to restore primary focus on collaborative mission accomplishment throughout the system, with mission support in its very important role of helping that accomplishment take place safely, securely and efficiently. This applies both to labs and to other nuclear sites. Culture change requires strong trusted relationships advancing sound risk management understood by all levels of the organization. This will take some time, and certainly any progress that we make over the next couple of years needs to have roots deep enough to cross different management styles and managers. Our DOE enterprise-wide team will continue to work hard to set the right directions.

The final major set of recommendations involved strengthening “customer collaboration ... and a shared view of mission success.” This refers principally to the DoD-DOE relationship with regard to the deterrent. Here again there are examples of progress, such as a better functioning Nuclear Weapons Council, but there are also specifics on which we clearly need to improve, such as streamlining how work is done for other national security agencies (DoD, Intelligence, DHS), even though the report does note considerable satisfaction as to how many capabilities and services are provided by the DOE laboratories and sites. However, there is an important point here on which I disagree with the panel. The report consistently refers to a “customer” relationship between DoD and DOE. This framing of the relationship is actually at the root of some tension. The two agencies have synergistic responsibilities for supporting our country’s nuclear defense posture and the President and Congress ultimately have responsibility for allocating resources for maintaining our national security. Furthermore the nuclear security mission is broader than deterrence, including the nonproliferation, naval propulsion, intelligence and environmental cleanup missions that reside with DOE. None of this excuses either DoD or DOE from carrying out its responsibilities in the most cost effective fashion, but the framework for discussion should be optimization of our national security needs among several agencies with complementary capabilities. DoD is not our customer, and we are not a vendor; together we bear the serious responsibility to deliver a safe, secure and effective deterrent for the American people.

The accompanying report from Administrator Klotz provides more detailed responses to the Augustine-Mies recommendations. I repeat that we are very appreciative of the panel’s work and of its thoughtful findings and recommendations. The panel lays out a challenging agenda, and we welcome it as an important contribution to assuring our country’s nuclear security for the long term. We look forward to working with the Congress and with other stakeholders on implementation.

Sincerely,



Ernest J. Moniz  
Secretary of Energy

## Executive Summary

This report provides the Department of Energy (DOE)/National Nuclear Security Administration's (NNSA) comments with respect to the November 2014 Report of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, *A New Foundation for the Nuclear Enterprise*, as required by Section 3134 of the National Defense Authorization Act for Fiscal Year 2015.

The Department of Energy (DOE) and the NNSA express their deep appreciation to the members and staff of the Congressional Advisory Panel for their service and for their exceptional contribution to our national security in rendering their comprehensive and insightful report.

DOE and NNSA have carefully reviewed the report's findings, conclusions and recommendations. We are pleased that the report recognizes many of the successes that the DOE and the NNSA have achieved as we carry out our important and enduring nuclear security missions, including conducting a science-based Stockpile Stewardship Program to annually certify the safety, security and effectiveness of American nuclear arsenal without nuclear explosive testing for over 20 years.

We also believe that the report correctly identifies and accurately describes the leadership, management, and cultural challenges that confront the nuclear security enterprise. To address these issues, the report makes 19 primary recommendations and 63 sub-recommendations to improve performance, efficiency and accountability--both now and in the future. Most of these can be implemented under the existing authorities of the Secretary of Energy and the NNSA Administrator. As described in detail in the pages that follow, DOE and NNSA have in fact already taken a number of actions that fully align with the panel's recommendations. Additional steps can and will be undertaken, informed by the work of the Congressional Advisory Panel, as well as other ongoing reviews. .

NNSA is committed to working with the Administration, Congress, our partners and other stakeholders to address the challenges and recommendations identified by the Congressional Advisory Panel in a comprehensive, forthright and transparent manner. Our highly talented NNSA team, comprised of our federal workforce and our Management and Operating (M&O) and other contractor partners, is committed to continuous improvement and achieving excellence in all that we do. Above all, NNSA remains dedicated to carrying out our nuclear and other national security missions, while being mindful of our obligation to continuously improve our business practices, to develop our people, and to be responsible stewards of the resources Congress and the American people have entrusted to us.

FRED UPTON, MICHIGAN  
CHAIRMAN

FRANK PALLONE, JR., NEW JERSEY  
RANKING MEMBER

ONE HUNDRED FOURTEENTH CONGRESS  
**Congress of the United States**  
**House of Representatives**  
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Majority (202) 225-2927  
Minority (202) 225-3641

March 24, 2016

The Honorable Ernest J. Moniz  
Secretary  
U.S. Department of Energy  
1000 Independence Avenue, S.W.  
Washington, DC 20585

Dear Secretary Moniz:

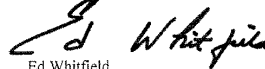
Thank you for appearing before the Subcommittee on Energy and Power on Wednesday, March 2, 2016, to testify at the hearing entitled "The Fiscal Year 2017 DOE Budget."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. The format of your responses to these questions should be as follows: (1) the name of the Member whose question you are addressing, (2) the complete text of the question you are addressing in bold, and (3) your answer to that question in plain text.

To facilitate the printing of the hearing record, please respond to these questions with a transmittal letter by the close of business on April 7, 2016. Your responses should be mailed to Will Batson, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, DC 20515 and e-mailed in Word format to [Will.Batson@mail.house.gov](mailto:Will.Batson@mail.house.gov).

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,



Ed Whitfield  
Chairman  
Subcommittee on Energy and Power

cc: The Honorable Bobby Rush, Ranking Member, Subcommittee on Energy and Power

Attachment

Mr. Moniz' response has been retained in committee files and also is available at <http://docs.house.gov/meetings/IF/IF03/20160302/104593/HHRG-114-IF03-Wstate-MonizE-20160302-SD086.pdf>.